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STUDIES OF MATERNAL AND INFANTILE BLOOD FACTOR RELATIONSHIPS.

By LUCY M. BRYCE, RACHEL JAKOBOWICZ and NORMA MCARTHUR,[1]

From the Australian Red Cross Blood Transfusion Service (Victorian Division), Queen Victoria Hospital, Melbourne, and the Walter and Eliza Hall Institute, Melbourne.

THE description of the Rh factor by Landsteiner and Wiener in 1940,[1] and early appreciation of its clinical importance by Levine and other workers,[2][3][4][5] have reawakened interest in the wider question of the possible part played by the incompatibility of mother and fœtus in respect of other blood factors, especially the A and B factors. The conception that such incompatibility may result in iso-immunization of the mother, which, in turn, may damage the fœtus *in utero*, is by no means recent. In a review entitled "Erythroblastosis Fetalis and Other Manifestations of Iso-Immunization",[6] Levine makes the following statement:

> The role of incompatible blood group matings in producing icterus gravis has been discussed twenty years ago by Hirszfeld, Ottenberg and others. Hirszfeld attempted to correlate the action of maternal agglutinins on fetal blood with the weight of the newborn infant. Several authors discussed the possible relationship of blood incompatibility with eclampsia. In any event, at that time these concepts could not be confirmed either clinically or statistically, but in view of the recent findings on iso-immunization and erythroblastosis fetalis, this entire subject merits reexamination.

[1] Statistician, Walter and Eliza Hall Institute (Haley Grant).

We are not attempting a complete review of the extensive literature on the role of the Rh and other blood factors in maternal iso-immunization, as we consider that it is dealt with very fully in such papers as those by Edith Potter[7] and W. C. Boyd.[8]

PRESENT STUDIES.

In view of the importance of the Rh factor in the production of *icterus gravis* and other manifestations of hæmolytic disease of the newborn, first established by the work of Levine and his colleagues[2][3][4][5] and rapidly confirmed by numerous other workers, a routine survey of women attending the ante-natal clinic of the Queen Victoria Hospital was commenced in 1943. The survey included the following observations:

1. Determination of blood group, Rh factor status and iso-agglutinin titre of all women at their first visit to the ante-natal clinic. The serum of all Rh-negative women was tested for Rh antibodies. If these were detected, periodic further tests were made at intervals of approximately one month.

2. If no Rh antibodies were detected at the first visit, further tests were made at about the sixth month of pregnancy. At the same time also, further tests for iso-agglutinin titres were made.

3. At or shortly after delivery, the blood groups and Rh factor status of the infants were determined and the mothers' blood was reexamined for iso-agglutinin titre, and if indicated, for Rh antibodies. In approximately half the series, both mothers' and infants' blood was obtained one to two days after delivery, but latterly samples were obtained from the mothers while they were still in the labour ward and from the umbilical cords of the infants at delivery.

4. In 111 cases the mothers' blood has been reexamined for Rh antibodies and iso-agglutination eight to ten days after delivery. The saliva of some of the infants in this

series was tested for the presence of group-specific receptor substances. In appropriate cases the mothers' milk has been tested for Rh antibodies.

5. Blood studies have been made on a small series of infants, who although they had not exhibited the more severe manifestations of hæmolytic disease which occur at or shortly after birth, later developed anæmia. These findings are referred to as "late anæmia" in Table VI, but are otherwise not discussed in this paper.

6. A series of married women donors of the Red Cross Blood Transfusion Service were interviewed and information was elicited regarding their obstetric history. The obstetric histories of women attending the ante-natal clinic were also obtained from the hospital records. These two series were analysed in order to ascertain, if possible, whether there was any significant difference in the number of "obstetric accidents" occurring in Rh-negative women as compared with those who were Rh-positive.

Technique.

Blood group tests were made on army tiles by the method described by Bryce and Jakobowicz,[9] and confirmatory tests were made on all maternal serum with known A_1, A_2, B and O cells.

Estimation of iso-agglutinin titre was made by serial dilution of the serum on army tiles. The reciprocal of the greatest dilution in which agglutination could be detected macroscopically was taken as the titre. It is recognized that this method gives slightly lower final readings (approximately one serial dilution less) than

TABLE I.

Blood Factors in Australian Population.

Blood Findings.	Ante-Natal Women.		Red Cross Blood Transfusion Service.		Defence Forces.	
	Total.	Percentage.	Total.	Percentage.	Total.	Percentage.
Group A_1	688	$40 \cdot 45 \pm 1 \cdot 04$	9,505	40·30	70,565	39·88
Group A_2	214					
Group B	218	$9 \cdot 78 \pm 0 \cdot 63$	2,220	9·41	17,215	9·73
Group O	1,036	$46 \cdot 46 \pm 1 \cdot 06$	11,220	47·58	84,034	47·49
Group AB	74	$3 \cdot 32 \pm 0 \cdot 38$	638	2·71	5,129	2·90
Total	2,230		23,583		176,943	
Rh-positive	1,852					
Rh-negative	378	$16 \cdot 95 \pm 0 \cdot 79$		16·4		

TABLE II.

Rh Antibodies Detected at First Visit to Ante-Natal Clinic.

Case No.	Rh Status of Patient.	Pregnancy.	Previous Obstetric History.	Duration of Pregnancy when Antibodies were First Detected.	Rh Type and Titre of Agglutinins.	Interval and Results of Retests.	Outcome of Pregnancy.	Rh Status of Child.
I	Negative.	7th.	Five living children; five months prior to this pregnancy, macerated fœtus at five months.	1 month.	Anti Rh_0. Titre: 4.	—	Macerated fœtus.	—
II	Negative.	7th.	Eight years ago living child, full term. Seven years ago stillborn child, full term. Six years ago miscarriage at four months. Five years ago twins, one died 20 minutes after birth. Four years ago macerated fœtus. Three years ago normal twins.	5 months.	Anti-Rh_0. Titre: 4.	6 months; 7 months; no rise in titre.	Delivered elsewhere; *icterus gravis*.	Rh-positive.
III	Negative.	1st.	——	5 months.	Anti-Rh_0. Titre: 2.	6 months; no rise in titre.	Did not report back.	
IV	Negative.	4th.	One living child (Rh-positive). One stillborn child at seven months. One miscarriage one month before this pregnancy.	7 months.	Anti Rh_0. Titre: 2, and blocking antibodies.	8 months; no rise in titre.		
V	Negative.	4th.	Three living children, full term.	7 months.	Blocking antibodies.	8 months; traces of agglutinating antibodies.	Macerated hydrocephalic fœtus.	
VI	Negative.	6th.	Four living children, one stillborn.	5 months.	Blocking antibodies.	6 months; no rise in titre.	Not yet due.	
VII	Negative.	3rd.	——	2 months.	Anti-Rh_1. Titre: 2.	4 months; no rise in titre.	Not yet due.	
VIII	Negative.	8th.	Five normal children. Sixth child very jaundiced. Seventh child very jaundiced.	2 months.	Anti-Rh_0. Titre: 2.	Monthly; no rise in titre.	*Icterus gravis*.	Rh-positive.
IX	Rh'.	3rd.	Two living children.	3 months.	Anti-Rh_0. Titre: 2, and blocking antibodies.	6, 7, 8 months; no rise in titre.	*Icterus gravis*.	Rh-positive (Rh_1)
X	Negative.	4th.	One living child. Two stillborn children.	2 months.	Anti-Rh_0. Titre: 8.	Monthly; no rise in titre.	Normal child.	Rh-negative.

the test-tube method previously described by us, but as comparative readings only were required, the tile method was used because of the great advantage it offered in regard to speed of performance and economy of equipment.

All blood samples were tested for the Rh factor with a potent standard (anti-Rh_0) serum of appropriate group or absorbed with cells or saliva, on glass slides by the method described by Simmons *et alii*.[10] Samples not agglutinated by this standard serum were retested with an anti-Rh_1 (anti-Rh_0') serum. It is recognized that a few patients classified as Rh-negative by this method may have belonged to subgroup Rh'', but no anti-Rh'' serum was available at the time when these studies were made. Demonstration of Rh agglutinins in serum and milk, Rh blocking antibodies and group-specific receptor substances in saliva were based on methods originally described by Wiener, Levine and Witebsky.

Results.

The total number of women examined at the first visit to the ante-natal clinic was 2,230. As a matter of interest, the blood group percentages obtained in this series were compared with those obtained in donors of the Victorian Division of the Red Cross Blood Transfusion Service, and with the results of tests made at the Walter and Eliza Hall Institute on members of the defence forces. The results are shown in Table I.

The iso-agglutinin titres obtained in pregnant women ranged from 4 to 4,000 with a mean of 107·08 ± 4·68 for anti-A and 46·28 ± 1·52 for anti-B. These titres will be further considered below in relation to those obtained later in pregnancy or at delivery. In ten cases Rh antibodies were demonstrated during pregnancy. The salient features of these cases are shown in Table II.

Fourteen cases (twelve from the Queen Victoria Hospital series and two from other sources) in which Rh antibodies were not detected during pregnancy, but were found at or after delivery, are also discussed, and the details are shown in Table III.

These 2,230 women may be divided into three groups: (i) 850 patients who have come to term and been delivered at the Queen Victoria Hospital; (ii) 1,054 patients not yet due for delivery at full term; (iii) 326 patients comprising 68 who did not return to the Queen Victoria Hospital for delivery, 192 who had living children, but from whom samples of blood were not obtained, 24 known to have had abortions (it is to be noted that some who did not return to hospital for delivery may also have had abortions), 68 who had stillborn children, 14 who had premature children, and 12 whose babies were sickly and did not survive for more than seven days. The blood factor relationships in this third group of 326 cases are shown in Table IV.

Analysis indicates that the third group is a reasonable random sample from the point of view of the blood factors. It therefore appears justifiable to regard the remaining 850 patients, about whose blood and about that of whose newborn infants at the time of delivery we have data, also as an unselected portion of the whole series. Data concerning the blood factors in this group of 850 mothers and babies are given in Table V.

This group of 850 mothers and babies may be divided into four sections: (i) Those in whom the major blood group factors (A, B, O) and Rh factors are either the same or compatible. Compatibility comprises a combination of a mother of blood group A,B, or AB with a child of blood group O, and an Rh-positive mother with an Rh-negative child. It may be noted that the combination

TABLE III.

Rh Antibodies Detected only At or After Delivery.

Case Number.	Pregnancy.	Previous Obstetric History.	Time of Tests before Delivery.	Condition of Child.	Titre at Delivery.	Titre on Retest.
I	1st	——	2 months. 6 months.	Jaundiced.	1	7 days: 1
II	9th	Eight living children; eighth pregnancy resulted in twins, both with *icterus gravis* (one died).	—	*Icterus gravis* and anæmia present.	64	7 days: 4,000
III	1st	——	8 months.	Affected by deep and increasing jaundice, head retraction, neck stiffness; death.	4	—
IV	4th	Three living children.	2 months. 6 months.	Normal on discharge from hospital.	2	—
V	2nd	One living child.	6 weeks. 6 months.	Normal on discharge from hospital.	1	—
VI	9th[1]	One normal child; two children jaundiced but recovered; three abortions at six months; one child with *icterus gravis* (five years ago).	3 months.	——	2	8
VII	1st	——	2 months. 8 months.	Normal on discharge from hospital; anæmic four weeks later.	1	—
VIII	2nd	Living child.	2 months. 6 months.	Slightly anæmic.	1	1
IX	1st	——	3 months. 6 months.	Jaundiced.	1	1
X	2nd	Living child.	7 months.	*Icterus gravis* present.	—	Agglutinating and blocking antibodies.
XI	2nd	Living child.	3 months. 6 months.	Normal on discharge from hospital.	1	1
XII	2nd	Living child.	2 months.	*Icterus gravis* present.	250	250
XIII	3rd	Two living children.	—	Anæmia present.	—	7 days: 2,000
XIV	4th	Two living children; one miscarriage.	—	*Icterus gravis* present; death.	—	9 months, 1,000

[1] Miscarriage at six months.

series was tested for the presence of group-specific receptor substances. In appropriate cases the mothers' milk has been tested for Rh antibodies.

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XII	2nd	Living child.	2 months.	*Icterus gravis* present.	250	250
XIII	3rd	Two living children.	—	Anæmia present.	—	7 days: 2,000
XIV	4th	Two living children; one miscarriage.	—	*Icterus gravis* present; death.	—	9 months, 1,000

[1] Miscarriage at six months.

TABLE IV.

Distribution of Blood Factors in 328 Women who were Tested only Once during the Ante-natal Period.

Description of Women.	Blood Group.				
	O.	A.	B.	AB.	Total.
Did not return to Queen Victoria Hospital (68)—					
Rh-positive	30	18	3	—	51
Rh-negative	9	4	4	—	17
Total	39	22	7	—	68
Had living children, but no blood sent to laboratory (192)—					
Rh-positive	70	75	14	7	166
Rh-negative	11	13	2	—	26
Total	81	88	16	7	192
Had abortions (24)—					
Rh-positive	12	7	2	1	22
Rh-negative	1	1	—	—	2
Total	13	8	2	1	24
Had stillborn children (16)—					
Rh-positive	8	5	1	—	14
Rh-negative	1	—	1	—	2
Total	9	5	2	—	16
Had premature children (14)—					
Rh-positive	6	6	1	—	13
Rh-negative	—	—	1	—	1
Total	6	6	2	—	14
Had children who died in first week (12)—					
Rh-positive	5	4	—	1	10
Rh-negative	—	2	—	—	2
Total	5	6	—	1	12

which potentially could stimulate Hr antibodies in the maternal serum is not possible with an Rh-negative child. (ii) Those with incompatible A and B factors, but compatible Rh status. (iii) Those with the same or compatible A and B factors, but incompatible Rh status. (iv) Those with potential incompatibility of both A and B factors and Rh status.

These four sections have been analysed with a view to detecting whether there is a significant difference between them in respect of possible damage to the fœtus or the infant. This possible damage has been considered under the headings of stillbirth, premature birth, *icterus gravis*, jaundice of lesser degree, and anæmia. We have accepted as the differentiation between *icterus gravis* and lesser jaundice the criteria described by Campbell.[11] With regard to anæmia, for the purpose of this analysis we included only cases in which anæmia was detected during the first few post-natal weeks in babies who did not earlier display any of the other manifestations considered possibly attributable to heterospecific pregnancy. Details are shown in Table VI and illustrated in Figure I.

It is noteworthy that in the third and fourth sections, which together include all cases of Rh incompatibility, the incidence (28·6%) of abnormalities in the baby is almost double that of the incidence (14·5%) in the first and second sections, in which the Rh status of the mother and that of the child are compatible. These findings give a value for χ^2 of 11·234 with P less than 0·001, which is statistically significant. On the other hand, if the first and second sections are compared with each other, the percentage of abnormalities in the first section in which A, B, O factors are compatible is approximately 14%, and in the second section, in which the A, B, O factors are incompatible, it is 17%. This difference is not statistically significant, nor is there a significant difference between the third and fourth sections, in which, however, the numbers may be too small for valid comparison. It is to be noted, however, that while the highest incidence of definite *icterus gravis* occurs in the groups in which Rh status incompatibility exists, the incidence of anæmia is highest in the group in which A, B, O incompatibility is present. While the number of cases of anæmia is not large enough for effective comparison, it is considered possible that this condition, either occurring alone or preceded earlier by relatively mild jaundice, may be a more frequent result of A, B, O incompatibility than are the more dramatic and fulminating forms of hæmolytic disease, which can usually be correlated with Rh incompatibility. A study is in progress of a larger series of cases which it is hoped will further elucidate this point. However, while it may be true that in general the manifestations of A, B, O incompatibility are milder and of later onset than those due to Rh incompatibility, there are, in the present series, four cases of *icterus gravis* in which Rh incompatibility could not be detected, but in which an A, B, O incompatibility was present. In all of these four cases of *icterus gravis*, and in all cases of anæmia so far detected in this series, the mother's serum titre for the incompatible A and/or B factor was appreciably higher at or after delivery than it had been at the first test during pregnancy; but it must be noted, on the other hand, that there are many cases in which a rise in titre, particularly after delivery, has no apparent deleterious effect on the fœtus or infant.

In the whole group of 850 cases, there were ten babies definitely diagnosed as suffering from *icterus gravis* (according to Campbell's criteria) and two doubtfully so.

This incidence of at least 10 in 850—that is, approximately 1 in 85—is higher than is usually estimated. For example, Burnham[5] reports an incidence of eight cases in 1,400 births, which is less than 1 in 200. Moreover, of our ten cases, four occurred in the first pregnancy; two of these, including one in which anti-Rh agglutinins were demonstrated in the maternal serum at delivery, were presumably due to Rh incompatibility. In a third case both mother and child were Rh-positive, but there was a potential A, B, O incompatibility (mother group O, child group A), and the maternal anti-A agglutinin titre rose from 500 in the third month to 16,000 at delivery. The child died on the second day, and autopsy revealed appearances typical of *erythroblastosis fœtalis*. In the

TABLE V.

Blood Factors in a Series of 850 Mothers and Babies.

Mothers.				Babies.			
Blood Group.	Number.	Percentage.	Rh-Negative.	Blood Group.	Number.	Percentage.	Rh-Negative.
A_1	258 } 323	38·0±1·7	54	A	351	41·3±1·7	68
A_2	65 }		7	O	399	46·9±1·7	58
O	416	48·9±1·7	60	B	74	8·7±1·0	17
B	83	9·8±1·0	19	AB	26	3·1±0·6	3
AB	28	3·3±0·6	6				
Total	850		146= 17·18±1·29%		850		146= 17·18±1·29%

TABLE VI.

Relationship between Blood Factors of Mother and Child and Obstetric Accidents.

Section.	Relationship of A, B, O Factors and Rh Status of Mother and Child.	Total.	Normal Babies.	Miscarriages, Abortions.	Still-births.	Premature Births, Living Child.	*Icterus Gravis.*	Mild Jaundice.	Late Anæmia.	Total Abnormalities.
I	Compatible A, B, O factors; compatible Rh status	595	513		2	17	2 doubtful	61		82
II	Incompatible A, B, O factors; compatible Rh status	171	142			9	4	9	7	29
III	Compatible A, B, O factors; incompatible Rh status	66	46		2	5	5	7	1	20
IV	Incompatible A, B, O factors; incompatible Rh status	18	14				1	2	1	4

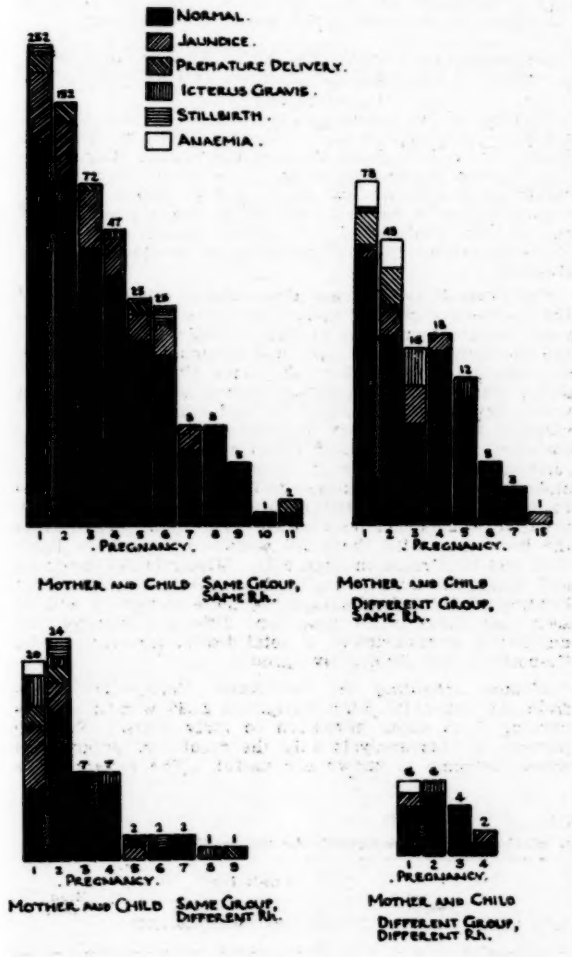

FIGURE I.

Percentage of obstetric accidents in relation to compatibility or otherwise of blood factors of mother and child. The height of each column represents the total number of cases in that class, and the shaded areas represent the proportion for each type of accident of this total number, whatever vertical scale is used. For numbers greater than 10, the vertical scale is logarithmic with a base line of 0·5; for numbers equal to or less than 10, the scale is arithmetical with a base line of 0.

fourth case occurring in the first pregnancy, both A, B, O factors and Rh status were incompatible.

In agreement with other workers we have found that the titre of Rh-antibodies in the maternal serum bears no relation to the severity of the disease in the child, nor in every case to the number of previous opportunities for stimulation. For example, in Case VI (Table III), antibodies were first demonstrated by us during the ninth pregnancy, prior to which the patient had had one normal child, two jaundiced children, three abortions, one child with doubtful *icterus gravis*, and an abortion at four months shortly before this ninth pregnancy. In spite of this history, no Rh antibodies could be detected before delivery, and the highest titre detected was 8 on the seventh day *post partum*. By way of contrast, in Case II, in which only the last of eight previous children appears to have been affected, the Rh agglutinating titre was found to be 4,000 seven days after delivery of a child with *icterus gravis*, which, however, survived. In Case XIII, after two normal children, the third was affected only by anæmia; but an anti-Rh agglutinin titre of 2,000 was present in the maternal serum seven days after delivery. In Case XIV, in which the mother's blood was not examined until nine months after the death of a baby from *erythroblastosis fœtalis*, and in which two living children had been born and one miscarriage had occurred previously, the Rh agglutinin titre was found to be still 1,000, and it has remained nearly at this level for more than two years.

These cases, therefore, illustrate the lack of correlation between the strength of the agglutinin titre and the severity of the disease in the child. All the nine cases of anæmia occurring as the only manifestation of hæmolytic disease were found in first, second or third babies, and seven of them were found to be associated with A, B, O incompatibility.

Iso-Agglutinin Titre.

According to the proportion of the blood groups in the population, about 35% of all matings would provide the possibility of maternal immunization by the A or B factors, but, in relation to gene frequencies, the theoretically estimated frequency of heterospecific pregnancy is 20%. In our series heterospecific pregnancies occurred in 189 cases (22·2%)—a figure which agrees closely with that of Allen.[32]

Theoretically, maternal immunization could be brought about by the escape of fœtal red cells or by the diffusion of specific soluble substances from the fœtal to the maternal circulation.

An investigation, so far comprising 111 cases, has been made of the relationship between fluctuation of iso-agglutinin titre in the maternal serum during pregnancy and fœtal incompatibility; the classification of the child after birth as a secretor or non-secretor has also been taken into consideration. In 45 of these 111 cases, mother and child were of compatible blood groups, and in none of these was a rise in agglutinin titre demonstrable eight to ten days after delivery. Eight of these 45 children were

tested and seven were found to be secretors. In the remaining 66 cases of this series the child's blood group was incompatible with that of its mother. Of these 66 cases, in 35 a rise occurred in maternal agglutinin titre and in one a fall, in blood taken eight to ten days after delivery. Twenty-eight of the children whose mothers' serum titre had risen or fallen were found to be secretors. The remaining eight children were not tested. No alteration was detected in the maternal serum titre in 30 of the 66 cases in which incompatibility was present. Fourteen of the children in this group were found to be non-secretors and nine to be secretors, and seven were not tested. It is possible that if more frequent testing of the maternal serum had been practicable a rise in titre would have been detected in more of these cases in which the child was a secretor. Boorman *et alii*[13] stated that the peak in the titre rise is usually ten to twenty days after delivery. We may, therefore, have missed a rise in titre in some of our cases. However, it was not practicable for us to obtain blood samples later than the tenth day, on which it was usual for the patients to leave the hospital owing to the shortage of beds. Even as they stand, however, our figures suggest a relationship between the secretor state of the child and rise in the corresponding maternal agglutinating titre. They therefore support the contention of Smith[14] that iso-immunization is usually brought about by passage of water-soluble group-specific substances across the placenta. It should be noted, however, that in some of our cases, in mothers of blood group O, there was not only a pronounced rise in the titre of the antibody corresponding to the fœtal antigen, but also a rise, though to a much smaller extent, of the titre of the other antibody in the A, B, O system. For example, in one case (mother of blood group O, baby of blood group A) the maternal antibody titre at the third month of pregnancy was: anti-A, 128; anti-B, 128. There was no rise at the time of delivery, but ten days later the anti-A titre was 16,000 and the anti-B titre 4,000.

The comparison between the iso-agglutinin titre of women whose children are later shown to be of incompatible blood group and of those with compatible children is shown in Table VII. The mean value given in this table is the geometric mean of the titres. By this method of statistical analysis, no significant differences could be detected.

These tests were made at an early stage (usually the third month) of pregnancy, at which the secretor state in the fœtus was probably not fully developed.[13] This might be thought to be the reason for the lack of significant difference between the two series. However, even at the time of delivery, when presumably secretor substances would be present sufficiently to act as antigens, only in occasional cases is a pronounced rise in titre demonstrable. But, as has been shown by Smith,[14] and by Boorman *et alii*,[13] when the infant is a secretor, a rise of titre occurs some days after delivery in the large majority of cases. These facts are hard to explain, but it is possible that the usual course of events is that the fœtal group-specific soluble substance acts as an antigen when it is diffused into the maternal serum, and later absorbs the maternal antibodies which it has itself stimulated when they in turn are diffused back into the fœtal serum. In occasional cases, in which a pronounced rise of titre in the maternal serum has been observed at the time of delivery, it must be assumed that such an equilibrium is disturbed, possibly because of variation either in the antigenicity of the specific soluble substance or in the immune response of the mother. There is, of course, the alternative possibility that, as has been postulated by Levine,[6] the antigenic stimulus is provided by fœtal red cells, which for some reason have been able to cross the placental barrier into the maternal circulation. A somewhat analogous phenomenon is the passage of malarial parasites from the maternal to the fœtal blood in the occasional cases reported of authentic congenital malaria.[15] It is, however, noteworthy that in all those cases in our series in which the infant was found to be a secretor and in which there was also damage attributable to A, B, O incompatibility, a rise in the maternal titre occurred at or after delivery. This close correlation between the rise in anti-A or anti-B titres and the secretor state does suggest, however, that the passage of group-specific soluble substances rather than the escape of red cells from fœtal to maternal circulation is the more usual mode of stimulation.

Comparison of Pregnancies, Fœtal Abnormalities and Fœtal Deaths among Rh-Positive and Rh-Negative Women.

In view of the widespread popular belief that there is a higher incidence of miscarriages, stillbirths, neonatal deaths and other obstetric accidents among Rh-negative than among Rh-positive women, we have attempted to obtain some data on this point, (*a*) by interviews with women donors of the Red Cross Blood Transfusion Service and (*b*) by analysis of the clinical histories of women attending the ante-natal department at the Queen Victoria Hospital.

Red Cross Blood Donors.—One hundred Rh-negative and 100 Rh-positive married women over the age of thirty-five years were interviewed. It was considered that by this age the majority would have had opportunity for families of reasonable size, and at the same time it gave us a larger number of Rh-negative women to call upon than would have been the case if we had restricted our interviews to those completely past the child-bearing age. We consider that the women interviewed represent a fair random sample, being taken in consecutive order from the alphabetical card index of the Red Cross Blood Transfusion Service until 100 each of Rh-positive and Rh-negative women had been called. The data elicited from the interviews with these 200 women are given in Table VIII and illustrated in Figure II. Miscarriages, abortions and stillbirths are all included in this table under the heading of fœtal deaths. Among these women it will be seen that there is no significant difference between the number of pregnancies or of fœtal deaths occurring in the Rh-positive and Rh-negative groups.

Women Attending the Ante-Natal Clinic.—The series from the ante-natal clinic comprises 2,230 women of ages varying from about seventeen to forty years. For the purpose of this analysis only the results of pregnancies whose outcome is known are useful. The *primigravidæ*

TABLE VII.

Comparison of Titres of Women at their First Visit to Ante-Natal Clinic, Classified into Compatible and Incompatible Maternal and Fœtal Blood Factors.

Blood Group of Mother.	Total.	Anti-A Titre.										Mean Value.	Anti-B Titre.								Mean Value.
		8	16	32	64	120	250	500	1,000	2,000	4,000		4	8	16	32	64	120	250	500	1,000	
Group A:																						
Compatible factors	308												2	18	48	87	84	41	20	6	2	46·41 ± 2·57
Incompatible factors	15														1	5	4	2	2	1		69·26 ± 17·21
Group B:																						
Compatible factors	64	1	8	9	21	15	4	4		1	1	76·33 ± 10·84										
Incompatible factors	20			3	8	4	3		1	1		109·31 ± 26·45										
Group O:																						
Compatible factors	265		7	44	66	66	58	14	8	2		107·72 ± 6·31	1	11	34	94	80	32	11	1	1	44·21 ± 2·21
Incompatible factors	151		3	16	41	41	31	11	8			121·96 ± 9·29		2	24	49	48	19	5	3	1	47·90 ± 3·23

TABLE VIII.

Comparison of Number of Pregnancies and Fœtal (Including Neo-Natal) Deaths among Rh-Positive and Rh-Negative Women (Red Cross Donors).

Observation.	Red Cross Donors, Aged Thirty-five Years or Over.	
	100 Rh-positive Women.	100 Rh-Negative Women.
Number of women never pregnant	10	12
Total number of pregnancies	275	276
Average number of pregnancies *per* parous woman	3·05	3·14
Average number of pregnancies in the whole series	2·75	2·76
Number of women with history of fœtal deaths	47	35
Total number of fœtal deaths	79	59
Average number of fœtal deaths *per* affected woman	1·7	1·7
Average number of fœtal deaths in the whole series	0·8	0·6

are therefore necessarily excluded. Data concerning the remaining 1,379 parous women were obtained from the recorded histories, and the findings are given in Tables IX and X. The number of pregnancies in relation to living children, fœtal deaths and prematurity are given in ratios rather than in total numbers, since in this series (as contrasted with that of the Red Cross donors) there is not an equal proportion of Rh-negative and Rh-positive women. Statistical analysis shows that in this group of 1,379

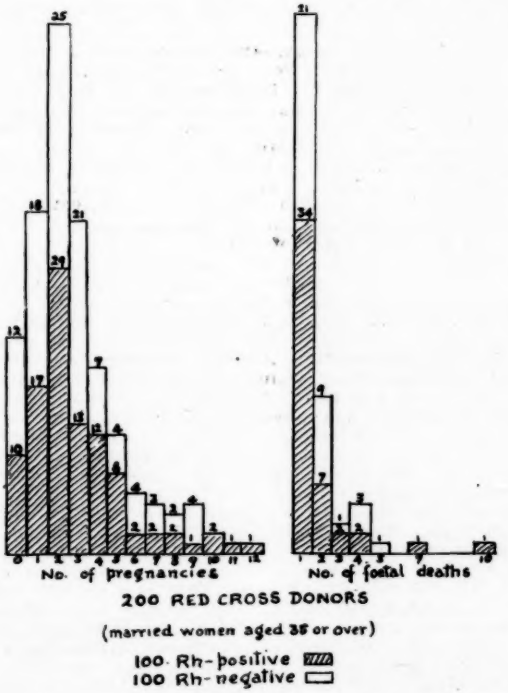

FIGURE II.

women, 17·98% (± 1·03%) are Rh-negative. This figure is statistically consistent with the 16·4% obtained in a series of 10,000 Red Cross blood donors (see Table I). There is also no significant difference between the mean number of pregnancies per woman or the incidence of fœtal deaths or prematurity among the Rh-positive women as compared with the Rh-negative women. Analysis also shows that while the total incidence of abortions, stillbirths and prematurity (collectively termed accidents) is of a similar order among Rh-positive and Rh-negative women, there is a significantly greater proportion of such accidents in the first pregnancy among both Rh-positive and Rh-negative women than in the second and third, in which manifestations of the effects of immunization of Rh-negative women may be expected to be more evident than in the first pregnancy. In later pregnancies (up to the sixth) there is no significant difference between the incidence of accidents among the Rh-positive and Rh-negative women. The figures for the greater number of pregnancies than six are too small for satisfactory analysis (see Table X). It is interesting to note that in this series there were three Rh-negative women who each had had seven pregnancies all resulting in living children, one who had had eight (all children living), one who had had nine (eight living children), and one who had had fifteen pregnancies and fifteen living children.

TABLE IX.

Comparison of Number of Pregnancies and Fatal Deaths and Prematurity in Rh-positive and Rh-negative Women.

Observation.	Rh-positive.	Rh-negative.	Total.
Number tested	1,131	248	1,379
Total number of pregnancies	2,576	572	3,148
Total number of fœtal deaths	378	94	472
Total number of premature deliveries	86	9	95
Average number of pregnancies per woman	2·28	2·31	2·28
Ratio between fœtal death and pregnancy	0·15	0·16	0·15
Ratio of premature births to pregnancy	0·03	0·02	0·03
Ratio of fœtal deaths to pregnant women	0·33	0·38	0·34
Ratio of premature deliveries to pregnant women	0·08	0·04	0·07

Comment.—It would, therefore, seem that there is no close correlation between such accidents taken collectively and the Rh-negative state, so that it can be emphasized that Rh-negative women can be assured that as such they are not necessarily doomed to a series of obstetric accidents. But, although our figures disclose no significant difference between the total incidence of obstetric accidents in Rh-positive and in Rh-negative women, there is a significantly higher proportion of those which occur late in pregnancy, such as prematurity, stillbirths and *icterus gravis*, which may result in neonatal death of the child, in cases in which Rh incompatibility between mother and child exists. The potential danger of these terminations of pregnancy arises most frequently in the cases in which Rh-negative women have Rh-positive fœtuses. This is inevitable if the mating has been with a homozygous Rh-positive male—that is, in about 38% of all matings.[16] Fifteen *per centum* of matings will be with Rh-negative men and the remaining 47% with heterozygous Rh-positive men. The latter matings will give even chances of the child's being Rh-positive or Rh-negative. However, the liability to such accidents is much less than these figures would suggest, as, according to Wiener,[17] approximately only 1 in 50 of all Rh-negative women are readily sensitized by an Rh-positive fœtus.

SUMMARY.

The points which emerge from the data concerning the group of 850 cases in which it has been possible to examine the blood of both mother and child may be summarized as follows: (*a*) The already well-recognized importance of the Rh factor in the production of hæmolytic disease of the newborn is apparent. (*b*) A statistically significant effect of Rh incompatibility in relation to total fœtal abnormalities can be demonstrated, although the incidence of individual abnormalities such as stillbirth and prematurity is possibly too small for valid analysis. (*c*) It appears that A, B, O incompatibility may be a cause of hæmolytic disease, especially the milder manifestations such as late anæmia, since, firstly, in all cases in which

TABLE X.

Incidence of Obstetric Accidents in Rh-positive and Rh-negative Women in Relation to Number of Pregnancies.[1]

Times Pregnant.	Rh-positive.		Rh-negative.		Total (Rh-positive + Rh-negative)	
	Number of Women.	Ratio of Accidents to Total Number of Pregnancies.	Number of Women.	Ratio of Accidents to Total Number of Pregnancies.	Number of Women.	Ratio of Accidents to Total Number of Pregnancies.
1	487	0·242±0·019	104	0·308±0·045	591	0·254±0·018
2	276	0·158±0·022	60	0·158±0·041	336	0·158±0·020
3	173	0·175±0·029	41	0·122±0·051	214	0·165±0·025
4	93	0·196±0·041	19	0·105±0·070	112	0·181±9·036
5	52	0·169±0·052	11	0·291±0·137	63	0·190±0·049
6	23	0·196±0·083	7	0·138±0·100	30	0·200±0·073
>6	27	0·097±0·057	6		33	0·093±0·051
	1,131	0·180±0·011	248	0·180±0·024	1,379	0·180±0·010

[1] The standard errors of the ratios are based on the number of women in the sample and not on the number of pregnancies.

these manifestations occurred, there was a rise in the iso-agglutinin titre in the maternal serum, and secondly, because in the large number of cases (595) in which complete compatibility between the blood of the mother and that of the child existed, the possible manifestations of hæmolytic disease consisted of only two doubtful cases of *icterus gravis*. (*d*) The incidence of *icterus gravis* is higher than in most previously reported series. (*e*) There is no correlation between the anti-Rh titre of the maternal serum and the severity of hæmolytic disease in the child. (*f*) The iso-agglutinin titre in the maternal serum, early in pregnancy, is not significantly higher in those cases in which there is a possibility of immunization by the fœtus than it is in those in which the mother and child belong to compatible blood groups. (*g*) At or more usually shortly after delivery, the titre of maternal iso-agglutinins corresponding to the infant's A or B factor may rise. This rise appears to be associated in most cases with the secretor state in the infant; but in some mothers of blood group O, a non-specific rise to a much lower degree has been noted in the antibody not corresponding to the infant's antigen.

In two series of cases, one consisting of 100 Rh-positive and 100 Rh-negative women, and the other of 1,379 women, unselected in respect of the Rh factor, there was no significant difference between the total incidence of obstetric accidents in Rh-positive and Rh-negative women. On the other hand, there was among the Rh-negative women a significantly higher incidence of prematurity, stillbirths and *icterus gravis neonatorum*.

ACKNOWLEDGEMENTS.

We wish to thank Dr. Kate Campbell and the resident medical and nursing staff and the officers of the pathology department of the Queen Victoria Hospital for their wholehearted cooperation.

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TUBERCULOSIS IN PREGNANCY.[1]

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IF a woman's health is sound, pregnancy, parturition and lactation are good for her; and if her health is impaired they may improve it. Even if she is wasted with tuberculosis she may appear to thrive for a time. The ancient physicians believed that pregnancy was beneficial to the tuberculous woman. It was not until the nineteenth century that pregnancy came to be regarded as having an invariably malign rather than a benign influence. Recent advances in diagnosis and treatment have forced a modification of this view. Physicians of the last century and the early part of the present century did not know of the great numbers of people who go through life unaware that they are affected with tuberculosis. They saw the evil effects of parturition and lactation on women with clinically recognizable disease; they did not know of the many with smouldering or inactive disease who bore and suckled their children unscathed. Furthermore, the treatment of tuberculous people in those days was poor. Viewed broadly, it is poor enough now; but in individual cases it can be efficient and good. Under suitable conditions many tuberculous women go through pregnancy and parturition without any apparent ill effect. We must revise our views on the influence of child-bearing on tuberculosis, and we must devise means for making the lot of the tuberculous pregnant woman easier.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on May 30, 1946.

Recent Investigations.

The two most valuable papers that I have seen in recent years are those of Hart and Wright[1] in 1939 and of Cohen[2] in 1946. An admirable review of the literature was given by Oxenham[3] in 1941.

The death rate from respiratory tuberculosis at all ages in England and Wales has steadily declined since the decade 1851 to 1860. But since 1900 the decline in the rate for females in the age-group of fifteen to twenty-four years has lagged. Indeed, during the years of the First World War the rate actually increased and it remained above the pre-war level for several years. The rate in the age-group of twenty-five to thirty-four years also suffered, but not to the same extent.

Various attempts have been made to account for this inconsistency. The most convincing is that of Hart and Wright, whose main conclusions are as follows:

> . . . retardation has been brought about by—
>
> (*a*) *A predisposing factor, i.e.,* the special sensitiveness of young adults, in comparison with persons of other ages, to social conditions . . . This sensitiveness is possibly the effect of combined environmental and biological causes—the stress and strain of industrial occupation during the important formative period of adolescence and early adult life.
>
> (*b*) *General determining factors, i.e.,* the contemporaneous country-wide changes in general social and economic trends . . . The most important of these changes are the check to the rise in the standard of living occurring about 1900 . . . and the accentuated increase in the industrial employment of young women also taking place about that date.
>
> (*c*) *Local determining factors, i.e.,* unsatisfactory local social conditions, rendering the effect upon the young adults in certain localities especially severe. Of these local social conditions housing appears to be of great importance. The part played by other factors in poverty is less clear. In the London boroughs . . . there is some evidence that other factors in poverty, such as inadequate nutrition, have also been influential.

The views expressed by Hart and Wright are mentioned here because in the opinion of at least one other writer, Wolff,[4] this retardation of the decline in the death rate of young women is due to the strain of child-bearing. In coming to his conclusion Wolff correlates birth rates with tuberculosis death rates. But he appears to overlook other possible factors. Furthermore a similar, though not so pronounced, retardation occurred in the decline of the death rate for males in the same age-group. It has yet to be shown that child-bearing has a deleterious effect on the tuberculous male.

Cohen has observed 177 tuberculous women who were attended in the maternity unit of the Black Notley Sanatorium from 1937 to 1945. Some of his figures are worth quoting here. His general immediate results are shown in Table I. Cohen has also been able to follow up 120 patients over periods varying from six months to four years and more. The results are set out in Table II. These figures are remarkable. One might almost say that they are amazing. But Cohen's patients were confined under conditions approaching the ideal. Where are such conditions to be found in this country?

TABLE I.
(*After* Cohen.)
The Immediate Results (Within Three Months of Delivery) of 277 Confinements in Black Notley Sanatorium.

Class of Case.	Number of Cases.	Number Showing Retrogression.
Arrested and recovered	69	3
Quiescent	50	5
Progressive	58	15
Total	177	23 (13%)

Some Statistics.

I have examined the records of deaths during the past three years of 25 women who have been patients at the clinic of the Anti-Tuberculosis Association of New South Wales, at Albion Street, Sydney. The results are set out in graphic form in Figure I. The numbers are too small

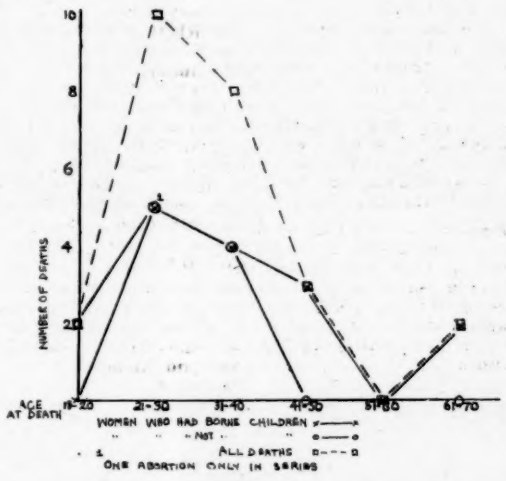

FIGURE I.
Showing number of deaths and ages at death of women who had borne children and women who had not borne children.

TABLE II.
(*After* Cohen.)
The Results of a Follow-up of Patients after Delivery.

	Follow-up Period.	Died.	Evidence of Retrogression.	Remaining Quiescent.	Became Quiescent.
Arrested and recovered (53 cases).	6 to 12 months	—	—	6	—
	1 to 2 years	1	—	9	—
	2 to 3 years	—	2	11	—
	2 to 4 years	—	—	5	—
	Over 4 years	1	—	18	—
Quiescent (35 cases).	6 to 12 months	—	—	1	—
	1 to 2 years	—	—	9	—
	2 to 3 years	—	1	7	—
	3 to 4 years	—	—	5	—
	Over 4 years	—	—	12	—
Progressive (32 cases).	Up to 1 year	2[1]	1	—	2
	1 to 2 years	4	1	2[2]	5
	2 to 3 years	3	1	—	3
	3 to 4 years	—	—	—	2
	Over 4 years	1	2	1[2]	2

[1] Both deaths while still in hospital. [2] Unchanged or improved.

to provide much information. For what the information is worth, it will be seen that the curves differ only in that the deaths of women who have not borne children occurred earlier in life.

I have also examined the records of 150 women between the ages of fifteen and forty years who are at present attending or have recently attended the Albion Street clinic. The results are shown in Table III. Ninety-eight of these women are married and 52 single.

TABLE III.

Showing Numbers of Patients who had had Abortions and Those who had Borne Children in Relation to Active and Inactive Disease.

Disease.	No Pregnancies.	Abortions Only.	Confinements and Abortions.	Confinements Only.	Total.
Active	54	3	6	30	93
Inactive ..	30	4	4	19	57
Totals ..	84	7	10	49	150

I have attempted to analyse these figures by plotting them graphically in various ways (see Figures II to IX). Examination of Figure II and Figure III suggests a higher incidence of the disease among those who have not been pregnant. This applies especially to younger women. The difference is not so pronounced where the disease is inactive. From an examination of Figure VI the further interesting feature is revealed that a higher percentage of women who had not been pregnant have active disease. This is particularly noticeable in the lower age-groups and may be accounted for by factors similar to those applying to actual numbers of patients.

Figures VII and VIII show that married women greatly exceed the single in numbers, whether the disease is active or inactive. Figure IX shows that the percentage of single women with active disease is much higher in the early years, but generally lower from the age of thirty years onwards. A remarkable feature is that no single woman aged thirty-one to thirty-five years has active disease.

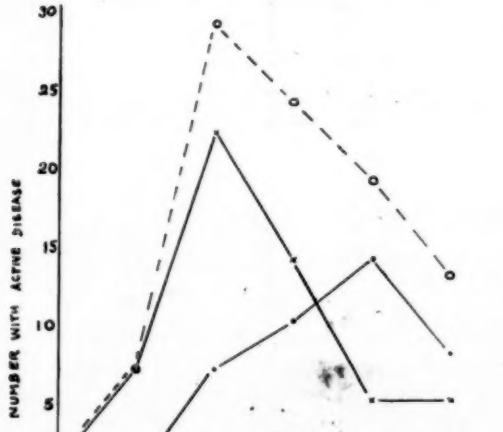

FIGURE II.

Showing active disease in relation to pregnancy.

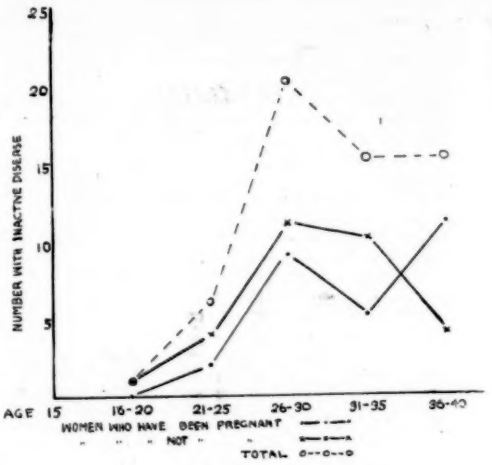

FIGURE III.

Showing inactive disease in relation to pregnancy.

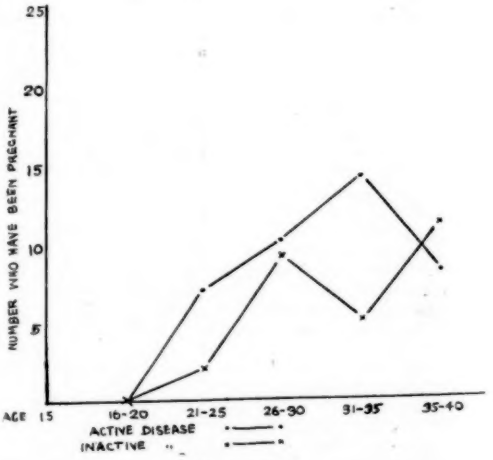

FIGURE IV.

Showing the relation of active and inactive disease in women who have been pregnant.

The favourable position of women who have been pregnant is explainable in several ways. In the first place a woman with active disease is less likely to marry and so is less likely to become pregnant; secondly, a married woman with active disease is unlikely to allow herself to become pregnant; thirdly, a married woman's economic state is better than a single woman's and she has not to work so hard.

It will be noted that in plotting these graphs I have not taken account of abortions as against confinements. The reason is that the numbers of abortions are too small to make any great difference.

My figures cannot be regarded as accurate. Women do not always give a true history when questioned about abortions; single women as a rule do not care to admit that they have borne children; and in many cases the records fail to show that a careful inquiry as to pregnancy was made when the history was taken.

The Effects of Child-Bearing et cetera.

What are the effects of pregnancy, of abortion and of child-bearing on the tuberculous woman? It is necessary

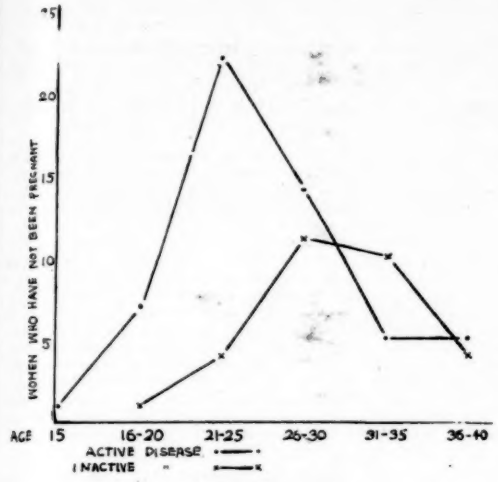

FIGURE V.

Showing active and inactive disease in women who have not been pregnant.

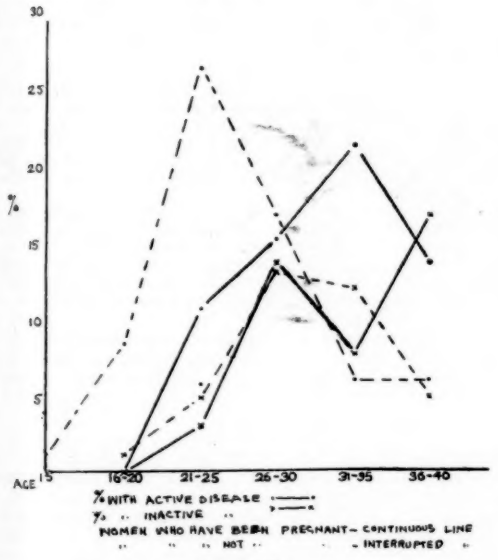
%
AGE 15 16-20 21-25 26-30 31-35 36-40
% WITH ACTIVE DISEASE
% INACTIVE
WOMEN WHO HAVE BEEN PREGNANT— CONTINUOUS LINE
NOT — INTERRUPTED

FIGURE VI.

Showing the percentage of active and inactive disease in patients who have been pregnant and in patients who have not been pregnant.

to have some kind of an answer to each of these questions before one can attempt to discuss the problem before us.

The Effects of Pregnancy.

What are the effects of pregnancy? If the pregnancy is normal I do not believe that it has any seriously damaging effect on the tuberculous woman. Certainly the disease may advance; but it may advance just as much in the absence of pregnancy. Complications of pregnancy, such as hyperemesis and eclampsia or preeclampsia, lower the vitality and so would be likely to cause exacerbation of active disease. Labour was induced because of pre-eclampsia in only one of Cohen's cases; but in this case the disease was already arrested.

Many tuberculous women appear to improve considerably in general health during pregnancy. The suggestion has been made that some change in the metabolism as a result of endocrine activity is responsible for this improvement. It has also been ascribed to the mechanical effect of elevation of the diaphragm resulting from increased intra-abdominal pressure. Support is given to this view by the retrogression that sometimes occurs when the intra-abdominal pressure is relieved—that is, after parturition. This has led naturally to the advocacy of the induction of artificial pneumoperitoneum after parturition, to imitate to some extent the *status quo ante partum*. But the intra-abdominal pressure is not sufficient to cause much elevation of the diaphragm until the later weeks of pregnancy. Furthermore, it has been shown that the diminution in thoracic content because of diaphragmatic elevation is more apparent than real, the thorax compensating for the shortening by expanding. Finally pneumoperitoneum without phrenic paralysis causes no apparent elevation of the powerful diaphragm, but only distension of the lax abdomen.

If the disease is quiescent or arrested, the question whether pregnancy will be damaging does not arise.

In discussing the results in his 177 cases, Cohen remarks: "In the great majority . . . pregnancy was little more than an important incident in the course of their illness."

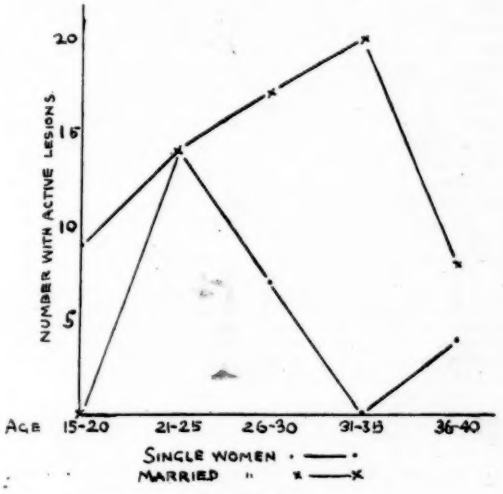

FIGURE VII.

Showing numbers of single women and married women with active lesions.

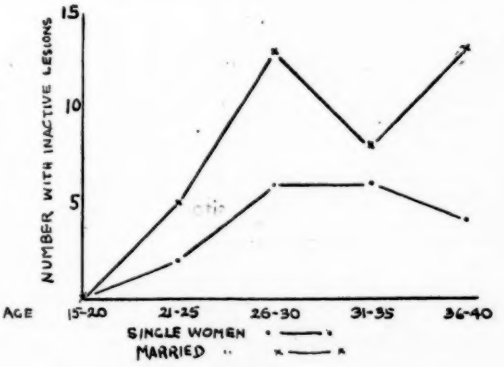

FIGURE VIII.

Showing numbers of single women and married women with inactive lesions.

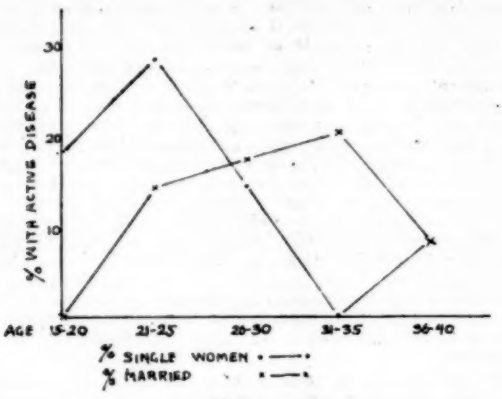

FIGURE IX.

Showing percentage of active disease in married women and in single women, respectively.

The Effects of Abortion.

What are the effects of abortion? Abortion has a damaging effect on the normal woman. If we can disregard the psychological aspects, it has an equally damaging effect on the tuberculous woman. A sudden interruption of the great train of physiological processes involved in pregnancy cannot take place without some damage. If the disease is active, abortion may conceivably cause exacerbation. The physician must make up his mind whether abortion or parturition is likely to be the more damaging. Having determined this point, he must decide whether he will subject the patient to abortion, with all its attendant anxiety, or allow the woman to exercise her most important function as a woman, at the risk of exacerbation through the strain of parturition.

CASE I.—A single woman, aged twenty years, a machinist, reported on January 20, 1936, complaining of recent pleurisy and hæmoptysis. She was rather thin. Crepitations were audible at the vertebral border of the right scapula. X-ray appearances suggested resolving pneumonia, but tubercle bacilli were found in the sputum.

She remained at home, resting most of the time. Her home conditions were good, except that she had an overbearing father with a little medical knowledge. Her weight changed little until 1938. Cavitation appeared. The whole of the right lung became involved. In 1937 she became pregnant. Abortion was induced at the Women's Hospital. Clinical evidence of active disease was still present. From this time on she showed evidence of improvement. Her weight increased and the radiographic appearances improved. In June, 1939, cavitation was no longer apparent. She married in 1940. When she last reported (February, 1944) she felt well, and the radiographic appearances did not suggest activity of the pulmonary lesions.

I do not propose to use this case as an argument to favour the use of pregnancy and abortion as a therapeutic measure. I can only say that pregnancy and abortion did not seem to do her any harm. It may be that if pregnancy had been allowed to continue she would have progressed just as well. A possible cause of improvement was her escape from paternal domination. Her father practically disowned her when she became pregnant. Then, two years later, she married and left home.

As in this case, tuberculosis in pregnancy seldom presents an uncomplicated problem.

The Effects of Parturition.

What are the effects of parturition? I believe that the strain of labour is bound to have a deleterious effect on a woman suffering from active pulmonary tuberculosis. The more closely the confinement approaches the normal, the less will be the damage; the greater the complications, the greater the damage. I refer particularly to protracted labour and obstetric operations.

On the other hand much of the strain of labour may be balanced by the beneficial rest of the lying-in period. Cohen has shown quite clearly that child-bearing need hold no terrors for the tuberculous woman if the confinement can be conducted under sanatorium conditions. The damage is likely to be greatest if neither the woman nor her medical adviser knows that she is tuberculous.

CASE II.—A married woman, aged twenty-six years, who had a child, aged thirteen months, reported on August 31, 1945. She had suffered from antritis. She had had a cough for years. She complained of loss of weight and of increasing fatigue. She was thin. Her temperature was 102° F. Clinical signs suggestive of tuberculosis were manifest. X-ray examination revealed appearances suggestive of calcification and fibrosis with a large cavity in the upper zone of the right lung, and softer shadows suggestive of recent infiltration in the middle zone of the left lung. The sputum was found to contain tubercle bacilli in great numbers.

Artificial pneumothorax was induced on the right side. A band of adhesions holding the cavity open was divided by Dr. C. G. Bayliss at Canterbury District Hospital. As the lesion of the left lung appeared to be advancing, artificial pneumothorax was induced on the left side also. She has improved somewhat in general condition and the cavity in the right lung has greatly diminished.

The disease in the right lung in this case is of long standing. Possibly cavitation was present for years. At first glance it would appear that pregnancy, parturition, lactation and the care of the infant had been too much for her. But the cause of breakdown is not so easily elucidated. This woman is married to a soldier, who has been away from Sydney for most of their married life. Anxiety over him and over the future and economic insecurity may also have played an important part.

CASE III.—A woman, aged twenty years, married, reported on September 7, 1943. She gave a history of hæmoptysis in 1941, when X-ray examination had shown "a spot at the left apex". She had a baby, aged one month. She waited six months for admission to a sanatorium; but by this time she felt so much better that she decided not to go. She was pregnant again.

X-ray examination showed appearances suggestive of bilateral apical fibrosis and thickening of the right interlobar fissure. The sputum was not examined.

She was advised to rest, but was unable to do so. In due course she had her second baby. X-ray appearances in June, 1945, suggested an advance of the lesions of the left side.

No conclusion as to the influence of pregnancy seems to be justified in this case. If she had rested she would have been better; but whether or not her pregnancy worsened the disease I cannot say.

The Effects of Lactation.

What are the effects of lactation? It is generally conceded that lactation is damaging to the tuberculous woman. Indeed, it is often during lactation that suspicion of tuberculosis arises. But lactation cannot be held solely responsible for the woman's retrogression in the months following her confinement. She has not only to be the fountain from which the infant drinks. She has also to clothe him and bathe him and care for him in a hundred ways, and she may also have to look after his father and the dwelling and possibly other children. It is here that economic factors come to the fore. The physician must consider these matters when his advice is required in the early months of pregnancy.

CASE IV.—A married woman, aged twenty-six years, reported on May 20, 1946. She had one child, aged two years. She had had no miscarriages. She had suckled the baby normally. After the birth of the baby she became very thin and "nervy". Eventually she recovered her weight and she felt well until about three weeks prior to reporting at the chest clinic. At that time she commenced to suffer with cough and sputum. These symptoms continued. Then, a week before reporting, she coughed a quantity of blood. The sputum was stained with blood the next day. She stated that X-ray examination eighteen months earlier had shown no evidence of disease. On clinical examination no gross abnormality was discovered. X-ray examination revealed evidence of extensive active disease of the left lung with a large cavity underneath the clavicle.

Two features in the history are of interest. In the light of present findings the history of loss of weight and malaise during lactation is strongly suggestive of active tuberculosis. But about six months after her confinement she was found by X-ray examination to have no tuberculosis. Comparison of the skiagram with that most recently taken might give useful information. On the evidence available at present, it would seem that her general health became impaired as a result of lactation and the work of a housewife and mother, and that her resistance to the tubercle bacillus was lowered. It is impossible to state whether the disease was present prior to parturition.

CASE V.—A woman, aged twenty-five years, single, a barmaid, reported on November 29, 1943, with a history of having been rejected from the Women's Australian Auxiliary Air Force twelve months previously because of a pulmonary lesion. She had been in a sanatorium for eight months. She looked well. X-ray examination revealed what appeared to be a healed lesion in the right lung and a more extensive area of fibrosis in the upper zone of the left lung. The blood sedimentation rate was slightly above normal. She had no sputum. She married in 1945 and became pregnant. In the meantime no great change had taken place in the X-ray appearances. The baby was born in November, 1945.

In March, 1946, she reported that she was always tired and had lost fifteen pounds of weight in the previous three months. The X-ray appearances suggested a recent spread in the left apical region.

Parturition and the physical and mental strain accompanying and following it seem to have caused deterioration.

The Medical Attendant's Advice.

Let us now consider how the physician may approach the various problems of tuberculosis in pregnancy.

Marriage and Contraception.

First of all, the physician may be asked by a single woman whether she should marry. My opinion is that marriage is good for her, whatever the state of her disease. This opinion is the result of observation of large numbers of tuberculous women and it is supported by such statistics as I have been able to obtain. The woman's medical attendant must be aware of other factors, such as the environment in which she will live after marriage, what her economic status is likely to be, whether she will be required to work harder, and so on, before he will give his advice. For instance: if a woman who has active disease will be called upon to work all hours in her husband's shop as well as in the home, marriage is contraindicated; but if marriage will mean a life of ease, it will be a health-giving procedure.

On the approach of marriage the woman will probably seek advice on whether she should prevent conception. On this question the medical attendant will be guided by the woman's general condition, by the state of the disease, by her environment, by her wishes, by her economic state, and by the possibility of obtaining adequate treatment.

Generally it may be said that if a woman has severe progressive disease, pregnancy is contraindicated except in special cases. If the disease is active at all, pregnancy should be postponed until the disease is under control. If the disease is arrested pregnancy is not contraindicated.

Pregnancy.

If a tuberculous woman has become pregnant, her medical attendant must bear in mind the same things as he did in determining whether or not conception should be prevented. In addition, the stage of the pregnancy and the woman's social state will have to be considered.

If the pregnancy has advanced to three months or more, abortion should not be recommended except as an urgent measure, and this urgency is unlikely on the sole grounds of tuberculosis. Probably it is safer and generally it is kinder to allow the pregnancy to continue until the fœtus is viable.

If the woman reports at an earlier stage of pregnancy, the medical attendant's advice will depend in the first instance on whether the disease is active or not, and if it is active, on whether it can be controlled.

The social state is of importance. A single woman is not as fit for child-bearing as a married woman.

I do not feel that I can lay down further general rules. Each case must be decided on its merits.

CASE VI.—A woman, aged twenty-six years, single, formerly a machinist, reported on May 1, 1942, after having spent fourteen months in a sanatorium. X-ray examination revealed bilateral apical lesions of a productive type. Her general condition was satisfactory. During the following years the radiographic appearances improved, until in July, 1944, the lesions were regarded as probably inactive. In 1945 she took a position serving drinks in an hotel bar from 4 p.m. to 6.30 p.m. On August 21, 1945, she was found to be pregnant. Termination of the pregnancy was recommended and was carried out at Sydney Hospital. Recent X-ray examination revealed no evidence of activity of the pulmonary lesions.

If this patient had been married it would have been better for her to continue her pregnancy to full term. As it was, she was living under unsatisfactory conditions in an unhealthy environment. It was thought that her lesions might break down under the strain. Two risks had to be considered: (i) the risk of full-term pregnancy and parturition; (ii) the risk of illegal abortion, which she as a single woman would probably take. Possibly even these considerations did not justify the recommendation of abortion. I am doubtful whether my decision would be the same now.

CASE VII.—A married woman, aged twenty-six years, reported in 1939. She had one child, aged one year. She had previously been in a sanatorium. She complained of hæmoptysis. X-ray examination revealed bilateral apical tuberculosis with cavitation. The sputum contained tubercle bacilli. She was admitted to a sanatorium, where she remained for ten months.

In September, 1940, the lesions had advanced. The patient was found to be pregnant. Although her general condition was good, it was considered advisable to recommend termination of the pregnancy.

The lesions continued to be active, and the sputum was found consistently to contain tubercle bacilli. She became pregnant again in 1942 and 1944. On each occasion the pregnancy was terminated early. Radiographically the abnormal shadows became denser. They have changed very little in the past two years. On radiographic evidence alone it would appear that the lesions are inactive. Furthermore the patient looks healthy. But tubercle bacilli can still be found in the sputum.

This patient is a pleasure-loving, foolish woman. She does not take proper care of herself and she refuses to recognize the risk of infecting her child, whom she fondles carelessly. In addition she herself is in constant danger of a sudden exacerbation of her disease. On the other hand, her husband is in regular employment, and she is able to afford good food and proper attention. It was thought that if pregnancy was allowed to continue the risk to her would be great and the risk to the children would also be great. She has almost certainly infected her child. If her pregnancies had been allowed to continue (assuming she survived those in 1942 and 1944) she would now be nurturing four tuberculous children (assuming they survived the dangers of tuberculosis in infancy).

CASE VIII.—A married woman, aged nineteen years, reported on June 23, 1944, with a history of persistent cough of three months' duration, of the loss of 28 pounds' weight in five months, of night sweats, and of fatigue. She had one young baby and was pregnant again. X-ray examination revealed an opaque area in the right hilar region and at the apex of the right lung. A month later cavitation was apparent at the apex of the right lung, and tubercle bacilli were found in the sputum. The pregnancy was terminated at three months, in July, 1944.

Artificial pneumothorax was induced; but, because of adhesions, it failed to obliterate the cavity. Her general condition steadily improved.

She became pregnant again. Abortion was induced at Sydney Hospital in February, 1945. Shortly after this she was admitted to Waterfall Sanatorium, where she remained for four and a half months. Pneumothorax treatment was suspended and the right phrenic nerve was crushed. The

lesions in the right lung gradually diminished. A minute lesion appeared at the apex of the left lung. It is now doubtful whether any activity exists. She is now five months pregnant and intends to have her baby.

Several interesting features may be noted. When this patient first reported she was very ill. It seemed possible that her recent pregnancy had been responsible to some extent for her breakdown. On the other hand, her home conditions were poor and she was an inexperienced and rather helpless sick wife. At this stage her chances of survival did not seem at all bright. What saved her, no doubt, was the period of complete rest in a sanatorium. The two abortions apparently did her no harm. Possibly they did her good by relieving her of the strain of pregnancy and the care of two additional infants. As the lesions now are probably inactive, she will be allowed to carry on to full term. It remains to be seen whether this will do her any harm.

CASE IX.—A married woman, aged twenty-four years, reported on August 21, 1945, complaining of the loss of nineteen pounds' weight in the previous seven months. She also complained of breathlessness, cough and sputum. She had one child, aged fifteen months. She was thin, slender and very pale. The right apical region of the thorax expanded poorly. X-ray examination revealed markings suggestive of fibrosis of the upper zone of the right lung and a small cavity at the apex. A small, apparently inactive lesion was noted in the middle zone of the left lung field. Tubercle bacilli were found in the sputum.

Artificial pneumothorax was induced on the right side, with satisfactory results. By November her weight had increased by one stone and she had lost her cough and sputum. In February, 1946, she was found to be four months pregnant. She was referred to the Royal Hospital for Women with a view to termination of the pregnancy. She was examined by Dr. Holmes à Court, who advised against this procedure. She is now seven months pregnant and is well. Artificial pneumothorax is being maintained.

At first I did not think it was right to allow this patient's pregnancy to continue. My views have changed in the light of Cohen's investigations. This woman's home conditions are good and her intelligence is high. I believe that she will do well.

I do not propose to discuss procedures for the termination of pregnancy nor for the supervision of labour and the puerperium. But I do stress the necessity of making the tuberculosis the prime consideration. The woman must have the best possible conditions. The ideal is confinement in a maternity block in a sanatorium. But here in New South Wales patients have to wait many months for the privilege of entering a sanatorium at all. As for maternity in a sanatorium—such a thing, I imagine, is almost unheard of.

There must be no hesitation about the induction of pneumothorax during pregnancy. Nor should the other minor surgical procedures, such as phrenic crush, be neglected if they are indicated by the state of the disease.

Summary.

1. Pregnancy that is otherwise normal probably does not cause exacerbation of tuberculosis.

2. Abortion is harmful; but, in progressive disease, it is less harmful than parturition, lactation and the subsequent months of work and anxiety.

3. Parturition is harmful to a woman with active tuberculous disease, the amount of damage depending on such factors as the environment of the patient, the length of labour, complications of labour *et cetera*.

4. Lactation and the care of the baby and home are dangerous to the woman with active tuberculosis.

5. In the great majority of cases no need to terminate the pregnancy exists.

6. The decision on whether or not to recommend termination of the pregnancy should depend in the first place on whether the disease is active, and if it is active, on whether or not it can be controlled.

7. Pregnancy should not be terminated for tuberculosis alone if the stage of gestation is over three months.

8. If the woman with active tuberculosis is allowed to have her baby, she must be given the best possible attention—preferably in a sanatorium.

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PULMONARY TUBERCULOSIS IN PREGNANCY.[1]

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PULMONARY TUBERCULOSIS associated with pregnancy has always been a problem for both the physician and the obstetrician, and although today opinion has gradually crystallized towards a more conservative attitude, the difference of opinion is still pronounced. It is almost an instinctive thought that the woman with tuberculosis is endangering her life by carrying on with a pregnancy; but I feel that, like a lot of other of our earlier conceptions of things medical, this view is not based on solid scientific grounds. Therefore, I intend to put before you a series of facts which, I trust, will help us to come to a fuller understanding of the subject.

Early Diagnosis.

That early diagnosis of tuberculosis is the key to the success of its treatment, no one will deny. Therefore, at the Women's Hospital, Crown Street, Sydney, since July, 1945, we have instituted the routine X-ray examination of the chest of all pregnant patients on a five inch by four inch film. Among 3,000 cases from July to March, active tuberculosis was found in eleven patients and a healed lesion in nineteen. These figures have been furnished by the radiologist, Dr. D. G. Maitland, who examined all the films. The eleven active lesions represent an incidence of 0·4%; but if we add the nineteen healed lesions, which must be watched, we have a total incidence of 1%.

Jacobs and Rachael Frank[1] in 1944 reported from the Paddington Hospital, London, the results of routine fluoroscopic examination of 1,125 patients, and the taking of full films in any doubtful case; they found 0·5% of patients with active tuberculosis and needing admission to hospital, 0·2% with less active lesions, and 0·8% with probably inactive lesions. H. K. Graham[2] reports a series of 800 private patients radiologically examined before confinement; 1% had active lesions and 3% were of a type that needed watching. Commenting on this article, the editor of "The 1941 Year Book of Obstetrics and Gynecology", states that 2% of the pregnant women at the Chicago Lying-In Hospital were found on radiological examination to have pulmonary tuberculosis. We may thus assume that the finding among these first 3,000 patients is a fairly accurate estimate of the incidence of tuberculosis, and therefore the figure will not alter much from 0·4% for active lesions and 0·6% for healed lesions—a total incidence of 1%. By way of comparison with the incidence of syphilis during pregnancy, I reported[3] that in 28,000 consecutive cases during pregnancy the incidence was 0·55%. No modern ante-natal department would consider omitting the routine Wassermann test as a part of ante-natal care, and therefore it behoves us to exercise the same care for the diagnosis of tuberculosis in expectant mothers,

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on May 30, 1946.

from the point of view of public health, and for the protection of the patient and those associated with the patient and particularly the child. It is unnecessary for me to labour this point, and you will, I think, agree that it is a definite forward step in ante-natal care.

Interruption of Pregnancy.

Next comes the old question of the interruption of pregnancy or of permitting the patient to carry the fœtus to term. This problem must be approached first by discarding all previously conceived ideas and basing judgement on the results obtained. Therefore I present an analysis of 92 patients admitted to hospital with the diagnosis of tuberculosis. As will be seen by Table I,

TABLE I.

Tuberculosis in Pregnancy; 92 Patients.

Details of Patients.	Number.	Deaths.	Live Babies.
Number of patients traced	82	25	—
Patients allowed to go to term ..	36	11	34
Patients whose pregnancy was terminated	46	14	—
Patients with severe lesions (both lungs or miliary tuberculosis)	42	21	—
Patients allowed to go to term ..	16	9	—
Patients whose pregnancy was terminated	26	12	—

36 were allowed to go to term and produced 34 live babies (two babies were premature and one was stillborn), and 46 had their pregnancy terminated. I must digress at this juncture to explain that a number of patients were referred from a neighbouring chest clinic for termination of pregnancy; the numbers became so great that the hospital was forced to curtail these admissions recommended for induction of labour, owing to lack of adequate space and nursing facilities and to danger to other patients. Of these 92 patients, all except ten (five with severe tuberculosis and five with mild tuberculosis, all but one of whom has had the pregnancy terminated) have been traced by the aid of the Tuberculosis Division of the Board of Health. Up to the present, amongst the 82 traced patients there is a total of 25 deaths. Of these 25 deaths, 11 occurred amongst those who were allowed to go to term, and of those whose pregnancy was terminated 14 died. As a point of interest, in 1945, 690 females were notified to the Board of Health as suffering from pulmonary tuberculosis. The deaths in the same year were 277 from pulmonary tuberculosis—a death rate of 40%. But when a patient's condition becomes notifiable, that fact implies that the sputum contains tubercle bacilli. Therefore I have grouped together 42 patients who have had a lesion in both lungs or miliary tuberculosis or sputum containing tubercle bacilli, and half of them have died. This is probably a more severely affected group than that of the Board of Health, as 35 of the 42 had both lungs affected. I am unable to use only the sputum as a standard, as in too great a number of these cases there is no record of the sputum. Among these 42 patients with severe lesions, nine of those who were allowed to go to term and 12 of those whose pregnancy was terminated died. The figures are somewhat loaded against those allowed to go to term, as two patients were admitted as "emergencies", one dying of miliary tuberculosis and one of tuberculous bronchopneumonia. Exclusion of these reduces the figure to seven. And so the death rate is approximately the same in the severe cases whether the pregnancy is terminated or not. In the less severely affected group of 45, 21 were allowed to go to term, and one death occurred. The sputum findings were not recorded in this case. The same result was recorded for the 24 whose pregnancies were terminated—two died, one had a single lesion and no tubercle bacilli in the sputum, and one had a single lesion and no record of the sputum.

It would appear from these figures that, since the gross death rates are almost identical amongst those allowed to go to term and those whose pregnancies are terminated, and that corresponding results are obtained when the tuberculous lesions are divided into mild and severe groups, there is little to be gained by termination of pregnancy. The more one dissects the figures, the more one is convinced that more lives are saved by active medical treatment, collapse therapy *et cetera* than by active obstetric treatment with its associated destruction of life. I make this statement after much thought. It is based on no other grounds than observation, and is contrary to my earlier belief on which I acted, in common with the majority of obstetricians, that a patient suffering from tuberculosis should have her pregnancy terminated before three months. I feel, however, that it would be wrong to state that no patient's pregnancy should be terminated. For example, a condition may become activated in early pregnancy and be aggravated by the malnutrition associated with excessive vomiting, or pregnancy may perhaps interfere with some planned treatment; but interruption of pregnancy is not to be considered as a method of treatment. Cohen,[4] in 1943, reviews 100 patients and reaches much the same conclusion; he considers that pregnancy and labour *per se* rarely exert any harmful effect on the progress of a woman known to have had tuberculosis, and that pregnancy is little more than an incident in a patient's tuberculosis career. J. W. Cutler,[5] in 1944, discusses the advantages of collapse therapy, and considers it as a substitute for abortion in many cases.

Treatment.

I leave to the physician the discussion concerning the best form of treatment. But facilities for treatment have not kept pace with modern knowledge—indeed, they are sadly lacking. Special provision should be made for the care and treatment of expectant mothers suffering from tuberculosis; there should be special departments associated with sanatoria where patients could be cared for during pregnancy, and what is more, after confinement. Every tuberculosis patient after delivery should have at least three months' rest and care, for this is the time of greatest danger, and one that should be provided for, but is not. The child which is, of course, artificially fed should also be cared for.

Tuberculosis in pregnancy is the problem of tuberculosis and not of obstetrics. The prognosis of pulmonary tuberculosis in pregnancy is the prognosis of the disease, which is little, if any, influenced by pregnancy. The main question really is, what is the best type of treatment for the particular patient? In conclusion I would reiterate that tuberculosis in pregnancy is rarely an obstetric problem, but one in which the physician and thoracic surgeon must see that the patient receives adequate treatment. Furthermore, those in authority must provide the facilities for this necessary work to be done—in other words, they must provide obstetric annexes to sanatoria.

Acknowledgements.

I wish to thank Dr. Alan Grant for searching the hospital records, and Dr. John Hughes for his cooperation in making accessible the Board of Health figures.

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THE BURNING FEET SYNDROME: OBSERVATIONS OF CASES AMONG PRISONERS OF WAR IN MANCHURIA.

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MANY patients suffering from a syndrome called "burning feet" were closely observed while the writer was responsible for the care of an infectious diseases ward in a prisoner-of-war hospital at Mukden, Manchuria. The manifestations of this syndrome suggest a relationship between dietary deficiencies and peripheral vascular disease. Previous descriptions of the condition have concerned its occurrence in tropical areas, and the peripheral vascular element, a prominent feature in the cases observed by the writer, was not pronounced. The severe cold of the Manchurian winter may have exalted the vascular changes to the leading role in the symptomatology, and so brought into prominence a hitherto unsuspected relationship between dietary deficiencies and blood vessels.

Details of the histories and physical findings in some of these cases were recorded, but were later confiscated by the Japanese. The report which follows is based on memory, supported by accounts obtained from individual patients two or three years later.

The subjects, all Americans, were members of a group of 1,400 Americans, 84 British and 16 Australian soldiers who comprised the original party which arrived in Mukden on November 11, 1942. All had been selected by the Japanese because of their relative fitness. Examination of blood films had revealed no evidence of malaria, and investigation of rectal swabbings gave negative results for (presumably) the Salmonella and dysenteric organisms. The British and Australian members of the group had been captured in Singapore, and after six months in Changi, came to Mukden in easy stages via Formosa and Korea. The Americans spent six months in the Philippines after their capture and were then brought direct to Manchuria.

The British-Australian group had endured starvation and had experienced a dysentery epidemic immediately after capitulation. Consequently they were manifesting obvious evidence of deficiency disease. The dysentery epidemic in the Philippines was more widespread and prolonged than that in Changi, mainly because the provision of bore-hole latrines was difficult and drugs were less uniformly distributed. Further, the monsoonal rains, much heavier in the Philippine Islands than in Malaya, had just finished before this group departed for Manchuria. The British-Australian party had a comparatively gradual introduction to the cold weather, whereas the Americans came to the Manchurian winter from the tropics after a few week on a troopship with the usual starvation rations—two meals of dried biscuits per day. The general condition of the Americans on their arrival in Mukden was consequently less satisfactory than that of the British-Australian group.

In Changi, attempts were made to provide yeast for all prisoners as soon as it was realized that the food provided by the Japanese would not improve, and that vitamin deficiency disease would certainly arise. The most satisfactory yeast cultures were obtained from Frazer and Neave's "Tiger" beer brewery. The Americans were less successful in providing yeast, and only a limited amount of "wild" yeast was obtained in the Philippines. The food provided during the first month after arrival in Mukden was very meagre indeed; it consisted of three meals per day of soup made from *kao-liang* (sorghum seed), and a few ounces of Russian-made bread. A flavour of pork was added to the soup once a day. On December 25, 1942, however, an important change occurred. Following many representations by the prisoner-of-war officers, soya beans were introduced and rapidly became the staple article of the diet. Soon afterwards some corn-meal (ground maize), and soya bean oil were also added. The yeast grown in Mukden was used exclusively for the baking of bread in the camp bakery, which commenced about the same time.

Symptomatology.

The incidence of symptoms amongst the 1,500 prisoners of war could not be accurately ascertained because of the restrictions imposed by the Japanese. It has, however, been estimated that at least 50% to 60% of the Americans displayed some evidence of the syndrome. The majority of the patients were mildly afflicted, only about 5% complaining of symptoms sufficiently serious to necessitate admission to hospital.

In practically every one of the mild cases, symptoms developed after the patients left the Philippines or soon after their arrival in Mukden. These patients complained of a sensation of burning in the feet, and of difficulty in walking and in wearing shoes. This burning was constantly present; it was often slight during the day, was relieved by cold, and was always more severe at night. Most of these patients slept at some time or other with their stockingless feet protruding from the blankets.

In the more severe cases, with one known exception, the disease had developed prior to arrival in Mukden. The outstanding symptom was pain of a burning character in both feet localized to the area normally covered by a shoe. It was present for twenty-four hours of the day, but towards evening it always became much worse and prevented sleep until the early hours of the morning. It impelled the patient to rub his feet, although they were exquisitely painful to the touch. By comparison it was bearable during the day, but an exacerbation occurred regularly every afternoon. The only method of obtaining relief was to expose the feet to the cold. Patients often did this by going out bare-footed into the snow at night, despite the pain caused by walking. Some patients immersed their feet in a bucket of snow and obtained sufficient relief to enable them to sleep for about an hour. By this time the snow had melted and warmed up, and the pain returned; the patients then repeated the procedure. After the patients were advised against these extreme measures they compromised by leaving their feet uncovered whilst lying in bed.

All those with the severe burning sensation also complained of a shooting type of pain. This always commenced in or about the great toe and shot up the inside of the leg, mostly reaching the inguinal region, but sometimes extending to the level of the umbilicus. It was sustained over the whole of its course for five seconds or so and then disappeared abruptly. These pains occurred in groups of varying number (three to five), and there were often several groups in an hour. They commenced towards the evening and continued until the patient fell asleep, exhausted, in the early hours of the morning. Individual shooting pains made the patient gasp, cease talking or cry out with pain. This type of pain was most severe when the burning pains were at their worst—that is, at night.

As the burning sensation became worse the patients complained that their feet felt hot. During the day these feet were generally cold to the touch, although the burning sensation was still present. Even the patients themselves noted the colour changes in their feet and mentioned the association of the reddening of their feet with the increase in pain.

Many soldiers in Mukden complained that the normal sensations from their bladder were dulled, and that involuntary evacuation of urine took place at night during sleep. However, there did not appear to be a greater incidence of these symptoms among the affected subjects observed.

Physical Findings.

During the day when symptoms were minimal, the feet presented a strikingly different appearance from that observed at night. In the daytime they were usually a dull, slaty-grey colour, especially under the toenails. The skin was thickened, smooth and dull. Perspiration was rare. At night the feet were swollen, the increase in volume being obvious, but insufficient to cause pitting on pressure. They were bright red in colour and the skin had a tense, shiny appearance. The subcutaneous veins were dilated and conspicuous beneath the skin and usually

stood out to the level of the knee, sometimes even as high as the inguinal region. The toes were spread apart and held rigidly with the proximal joints extended and the distal joints flexed. The tendons on the dorsum of the foot were prominent and some degree of spasm was present in the leg muscles.

During the day sensitivity to very light touch was lost, probably because of the cutaneous thickening. Touching the feet with the fingers, even merely disturbing the hairs, produced a painful sensation which the patients described as burning. Pinprick elicited the same burning pain. However, the perception of heat and cold was not grossly deranged. At night these changes were all much more pronounced. In addition, to touch a distended vein produced a shooting pain along its course as far as it was visibly distended.

In the daytime it was fairly easy to feel the pulsation of the *dorsalis pedis* artery, but more difficult to feel those of the posterior tibial artery. At night the excruciating pain produced by touching the feet rendered such palpation impossible. Occlusion of all the blood vessels of a limb or of the veins alone for about three minutes by means of a sphygmomanometer cuff did not precipitate an exacerbation of the pain. Further, these tests produced no petechial hæmorrhages.

At night, if pressure was applied to the skin, the resultant blanching was of extremely short duration. Elevation of the feet did not alleviate symptoms and did not alter the colour of the feet. Yet some patients stated that, if they left their feet hanging down during the afternoon, the severe pains began earlier that night than was usual. Despite the continuous burning pain the feet felt cold during the day, both subjectively and to the touch. At night they felt distinctly hot. The temperature of the feet, whether hot or cold, could not be influenced by warming or cooling of the rest of the body surface.

Knee jerks were present in about two-thirds of the cases and sometimes were even exaggerated. Ankle jerks were always difficult to elicit, because patients held their muscles tense and were not able to relax completely. Pressure over the calves usually evoked a painful response. Muscle power was not significantly diminished when the advanced state of undernutrition of the subjects was considered. A few patients, not necessarily those with the most severe symptoms, developed a mild burning sensation in their hands, which was associated with reddening and some slight swelling. In these cases no additional local signs were detected, and no untoward effects were produced in the arms by application of the sphygmomanometer cuff for five to ten minutes at different pressures.

No other relevant local physical findings were discovered in any of the patients suffering from the syndrome, but in common with the unaffected members of the camp, nearly all the subjects had some degree of hypotension. The systolic blood pressure was usually 90 to 100 millimetres of mercury and the diastolic pressure 60 to 70 millimetres. Œdema was rarely present, and was thought to be due to hypoprotinæmia and not to the so-called wet beriberi. Diarrhœa was universal in the camp during the warmer weather. The other symptoms of deficiency of various factors of the vitamin *B* group were present—for example, scrotal irritation and glossitis—and with one exception did not appear with increased incidence among sufferers from the "burning feet". This exception, which was also noted by other observers in Mukden, was that failing of vision seemed to be more prominent among such people.

Progress.

In the severe cases, the symptoms were at their worst during the first six months (the first winter). With the arrival of the warm weather the patients' condition began to improve. However, during the following winters the symptoms were worse than they had been during the preceding summers, but improvement was steadily maintained. Most of the patients were able to get up during the first summer, but their activities were greatly curtailed during the next winter, mainly because of the intense cold. By the summer of 1944 all patients had been discharged from hospital, with the exception of two who suffered from intercurrent diseases. When the patients were first able to walk their gait was peculiar. A foot was lifted so that all parts of it left the ground simultaneously. It was carried high and then cautiously placed on the ground so that all parts contacted the ground at the same time. The patient was unstable and looked like overbalancing when only one foot was on the ground. When improvement had occurred, it was noticeable that the feet were always cold and were often affected by fine desquamation. All the patients remarked on the fact that their feet did not perspire even in summer. In addition, they were subject to "starts" (or spasmodic jerking) in the legs during periods of sleep or relaxation. By August, 1945, none of the more severely affected patients were symptomless; but they were all working and not unduly troubled by the residual symptoms.

As has been mentioned earlier, the majority of patients who exhibited this syndrome did so in a mild degree. They had recovered within six months and subsequently did not suffer any recurrence of symptoms.

Treatment.

Practically no treatment was available. A Japanese brand of yeast powder named "Ebiose", *"tiki-tiki"* which was thought to be rice polishings, and a few ampoules of vitamin *B* were provided by the Japanese. These substances were administered more in faith than in hope. One brand of vitamin *B* contained 0·1 milligramme of crystalline vitamin B_1 per millilitre, and the Japanese dosage was three millilitres per week for one patient. Morphine was used sparingly, and phenobarbital had little effect. Cradles were provided to keep the feet from touching the bed-clothes. The patients were discouraged from exposing their feet to the cold, and were forbidden to place them in snow. Only one patient is known to have developed gangrenous patches. This may have been due to the effects of exposure to snow, but could even have been due to the disease process itself. Some patients kept their feet elevated during the day, but this did not minimize the evening exacerbation. Attempts were made to obtain special consideration in diet, especially with regard to extra soya beans. The Japanese countered these efforts by saying that if hospital food was bettered malingering would be encouraged, and that as sick men were not working, they needed only two-thirds of the rations of the working men. Despite the great shortage of drugs, these patients were given preference when they suffered from diarrhœa. It was held that diarrhœa would result in decreased absorption of proteins and vitamins, and that these patients, above all others, could not afford to waste any of their meagre supplies.

Discussion.

The nature of the pain, the colour changes, the changes in skin temperature, the dilatation of the veins, the swelling, and the return of colour following pressure, strongly suggest a gross abnormality of the peripheral vascular system. The exacerbation and remissions exhibited in this syndrome are also found in well-defined peripheral vascular conditions, but in the latter they are usually irregular and evoked by some definite stimulus. In the cases described, however, the most likely factor stimulating an exacerbation was the considerable drop in temperature in the barracks at night. This, being a regularly occurring event, would explain the regular return of exacerbations each night. Further, the localization to the feet, which was noted with few exceptions in this syndrome, is not inconsistent with peripheral vascular disorders—for example, erythromelalgia.

The sympathetic nervous system was also involved, as is shown by the loss of sweating and by the fact that the skin temperature of the foot remained uninfluenced by the warming and cooling of the rest of the body. It is possible that the vasomotor changes were secondary to those in the autonomic nervous system. However, no evidence of any direct relationship could be adduced, because autopsies

and histological examinations were not performed on patients who died from other causes. But it is difficult to postulate that a peripheral vascular disorder and an autonomic disturbance could exist simultaneously without the former's being secondary to the latter.

Owing to the lack of facilities for precise diagnosis, there was a great tendency to label obscure conditions as deficiency diseases. But such a possibility is favoured in this syndrome by the following observations: that the disease appears to be unknown in all climates among people receiving adequate diets; that it arose in widely scattered places among prisoners of war, all of whom suffered from food deficiency; and that a varying degree of recovery occurred in all cases after the quality of the food had improved. In Mukden the complete recovery in the mild cases and the improvement in the severe cases followed a radical change in the diet.

In common with known dietary deficiencies, symptoms appeared only after a long period of deprivation, and recovery was delayed even when the diet had improved. Cases did not arise in the various prison camps until at least six months had elapsed after capture. Furthermore, their appearance in Changi two or three months after they arose in the Philippines would indicate that the prisoners in Changi had been receiving a larger, but nevertheless inadequate, amount of the necessary factor during their imprisonment than had the Americans in the Philippines. The British-Australian group in Mukden escaped the disease probably because they had left Changi before their reserve stocks were depleted. After their arrival in Korea sufficient was provided to maintain an adequate quantity to prevent the onset of symptoms. The fact that some of the Americans continued to develop symptoms after arrival in Mukden, despite the great improvement in the diet, might indicate that their reserve stocks were low, and that some months had to elapse before the body reserves reached an adequate level.

In all the mild cases recovery occurred within six months, and there was no subsequent relapse. This slow recovery could be explained by the assumption that the quantity of the missing factor now supplied in the diet, although adequate to prevent the development of new cases after the first few months, was insufficient to replenish the body reserves rapidly. Although in the advanced cases the patients' condition improved after they had received the better diet for some months, many still had symptoms after three years. No doubt structural damage had occurred in these cases and was responsible for this slow rate of recovery. A possible factor contributing to the structural damage could be the extreme cold of the Manchurian winter. As far as could be ascertained, the most severe examples of the syndrome were seen in Japan and Manchuria. In tropical areas new cases continued to arise and relapses continued to be observed, long after cases had ceased to occur in Mukden (personal communications from Lieutenant-Colonel W. Cotter Harvey, Australian Army Medical Corps, and Lieutenant-Colonel W. Jacobs, Medical Corps, Army of the United States). The greater severity in the above-mentioned places would appear to be likewise the result of the rigours of the winter.

As has already been mentioned, the disease appeared at a later stage in Changi than it did in the Philippines, and this was thought to be due to the fact that the British and Australians in the former area received a slightly greater amount of the necessary food factor. A consideration of the diets in both places shows that the most important difference was the more universal use of yeast in Changi. It seems likely, therefore, that the necessary factor is found in yeast and so is related to the vitamin *B* complex.

It may be suggested that the syndrome is produced by an infection. This, however, seems unlikely, when it is considered that the British-Australian group in Mukden did not develop symptoms despite intimate daily contact with the Americans. Also the syndrome appears to have arisen at roughly the same time in isolated prisoner-of-war camps scattered throughout the east.

It is readily admitted that the foregoing description may be incomplete, and it is possible that in the existing circumstances some omissions may have occurred. However, many other medical officers witnessed the condition, and it is hoped that their criticism and corrections will be forthcoming to complete the picture. It is also hoped that others will record observations on the usually rare afflictions so frequently encountered under prisoner-of-war conditions.

Summary.

1. The "burning feet" syndrome is described as it occurred amongst prisoners of war in Manchuria.

2. A gross disorder of the peripheral vascular system was the most conspicuous feature in the advanced cases of this syndrome.

3. It is possible that these changes were the result of a disturbance of the autonomic nervous system, and aggravated by cold.

4. The causal factor appears to be a deficiency of some part of the vitamin *B* complex.

Acknowledgement.

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DANGEROUS BLOOD DONORS.

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ALTHOUGH the serological examination of blood donors for factors which may cause reactions in recipients is a routine investigation in most transfusion services, occasional instances may occur in which, if the investigation is not complete, a disastrous reaction may result. This applies particularly to cases in which the donor is Rh negative and may have been immunized either by a previous blood transfusion or, if a female, by a previous pregnancy. The danger is to a large extent overcome by being sure that the blood of Rh-positive donors is given to Rh-positive recipients, and that of Rh-negative donors to Rh-negative recipients. Even with this precaution, unless inquiries are made into the history of previous blood transfusions and pregnancies, there remains the possibility that Rh subtype iso-immunization[1][2][3][4] may have occurred. Since Rh iso-hæmagglutinins do not occur unless the subject has been immunized, the extra precaution of using only male donors, who have themselves never been the recipient of a blood transfusion, may be adopted. This would apply particularly in urgent cases, in which there is little time to apply full serological tests. The use of male donors who have never received a transfusion would be the selection of choice for direct transfusions, since the full quantity of blood is transfused before there is time for a reaction to occur.

Naturally-occurring anti-M iso-hæmagglutinins are so extremely rare that they may be almost disregarded.[4] Iso-immunization of factor P is also rare, but should be remembered and excluded.[5]

There is, however, a great difficulty in the detection of weak, abnormal antibodies, since the routine test of matching the serum and cells at 37° C. fails in many instances to produce a positive reaction, or it may give a reaction which is doubtful. Common "blocking" antibody fails to produce agglutination by this method, and the full-scale test must be instituted.

Various workers have devised tests which disclose the blocking antibodies. The tests may be summarized as follows: (i) Wiener's "blocking test"[6] and Race's test for the "incomplete" antibody;[7] (ii) Wiener's "conglutination" test;[8] (iii) Diamond and Abelson's rapid slide test with whole blood;[9] (iv) Diamond and Denton's test with 20% serum albumin;[10] (v) Coombs, Mourant and Race's test, with a rabbit of anti-human-globulin serum;[11] (vi) Wiener's biological test.[12] Readers are referred to the original articles for the technique employed in each instance.

The following cases are reported because in donors dangerous iso-hæmagglutinins were detected which would have been missed by the cross-typing method adopted for everyday use.

Reports of Cases.

CASE I.—Mrs. W., a parous woman, aged thirty-two years, registered as a donor, as she wished to replace blood given to her mother following a major surgical procedure. Upon enrolment she was asked the routine questions in regard to previous blood transfusions *et cetera*, and whether her children had been jaundiced. She had never received a blood transfusion, but had had three normal pregnancies, and none of the children had been jaundiced. Upon further questioning later, she admitted that the second child had had transient jaundice on the second day, lasting for a few hours only. The first and third children had been perfectly normal and all children are alive and well. Her erythrocyte group was found to be O Rh-negative (Hr positive), N and P positive, and on serological examination her serum had Rh-agglutinating antibodies, of specificity anti-Rh^0, to a titre of 1:500; but "blocking" antibody was not detected.

The grouping of the family is as follows:

Mrs. D.W.: O Rh-negative (rhrh) (Hr-positive) N.P-positive.
Mr. A.W.: A_1 Rh-positive (Rh$^{0'}$) (Hr-negative) N.P-positive.
First child, J.W., born 1939: O Rh-positive (Rh$^{0'}$rh) (Hr-positive) N.P-positive.
Second child, P.W., born 1943: O Rh-positive (Rh$^{0'}$rh) (Hr-positive) N.P-positive.
Third child, D.W., born 1944: O Rh-positive (Rh$^{0'}$rh) (Hr-positive) N.P-positive.

It will be noted that the father is homozygous Rh-positive (Rh$^{0'}$Rh$^{0'}$ probably),[1] and hence every child of this mating should be heterozygous Rh-positive (Rh$^{0'}$rh) and its blood is therefore incompatible with that of the mother. This was indeed found to be the case. The Rh-negative mother is therefore liable to be immunized by every child which she has to him. It is obvious that the mother has been immunized by her pregnancies to a high degree; but why the children, particularly the last, were clinically unaffected by the maternal iso-antibodies is unexplained. Similar cases have been reported previously by Dockeray and Sachs[13] and by Simmons and Kelsall.[2]

CASE II.—In this case also the woman presented herself as a blood donor. Her eldest and only surviving child, born twenty-one years ago, was jaundiced at birth. Subsequently she had six stillborn or icteric infants, all of which died in the neonatal period. The last child was born ten years ago. The mother's serum still contains antibodies of specificity anti-Rh^0 to a titre of 1:16.

Comment.

From the transfusionist's point of view the interest in these cases lies in the fact that had these persons been used as blood donors, the dangerous Rh antibodies would not have been detected by the routine cross-typing tests adopted before blood transfusions.

It should be remembered that the usual cross-typing test is to match the donor's cells against the recipient's serum at room temperature. Unless the "reverse" test for sixty minutes at 37° C., in which the donor's serum is matched with the recipient's cells, had been adopted, the giving of the donor's Rh-negative blood to an Rh-positive person would have been open to the grave complication of an incompatible, hæmolytic reaction. Had the donor's antibodies been weak or of the "blocking" type, they would have been missed entirely, unless one of the six methods enumerated above had been adopted for their detection.

It is a routine measure in the Red Cross Blood Transfusion Service in Western Australia, that all Rh-negative donors shall be tested for antibodies before their blood is released from the bank. It is probable that in future one of the more highly sensitive tests will have to be applied as a further safeguard. As has already been mentioned, it is also a rule that homologous blood (in respect of Rh^0) is administered at every transfusion, unless the emergency is of such a nature that Rh grouping must be omitted. We are fortunate at the present time in possessing an anti-Rh^0 serum of such potency that it gives a result in ten minutes at room temperature. Thus the A,B,O and Rh tests are performed simultaneously, and the delay of incubating the test material at 37° C. for one hour is obviated.

Conclusions.

1. All parous women and all persons who have themselves been the recipient of a blood transfusion, should be regarded as potentially dangerous donors. If blood of such people is to be used for transfusion purposes, it should be examined for iso-antibodies before release.

2. It is particularly important, when giving transfusions to infants suffering from hæmolytic disease of the newborn, that the donor's serum be examined for abnormal antibodies before it is administered.

3. Conversely, if the recipient of a blood transfusion is a parous woman or has received a transfusion at an interval longer than a week previously, the cross-typing test should be performed at 4° C., 20° C., and 37° C. for one hour.

4. When, from the previous history, the blood of either the donor or the recipient is suspected of containing iso-antibodies, and if these cannot be detected by the usual agglutinating technique, one or more of the sensitive methods should be employed.

[1] His other possible but improbable genotypes could be either Rh^{0}Rh$^{0'}$, Rh'Rh$^{0'}$ or Rh^{0}Rh'. The first of these is homozygous for Rh$^{0'}$, the second heterozygous for Rh^0, while the last, though heterozygous for Rh^0, is excluded by the genotypes of the children. Similarly, the other Hr-negative genotype, Rh'rh', is excluded by his being Rh^0-positive. Finally, the first and third possibilities should be excluded, as theoretically at least they should be Hr-positive and not Hr-negative. The second possibility is almost excluded, because of the rarity of Rh' and its absence from any of the children.

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(9) L. K. Diamond and N. M. Abelson: "The Demonstration of Anti-Rh Agglutinins—An Accurate and Rapid Slide Test", *The Journal of Laboratory and Clinical Medicine*, Volume XXX, 1945, page 204.

(10) L. K. Diamond and R. L. Denton: "Rh Agglutination in Various Media, with Particular Reference to the Value of Albumin", *The Journal of Laboratory and Clinical Medicine*, Volume XXX, October, 1945, page 821.

(11) R. R. A. Coombs, A. E. Mourant and R. R. Race: "A New Test for the Detection of Weak and 'Incomplete' Rh Agglutinins", *The British Journal of Experimental Pathology*, Volume XXVII, 1945, page 255.

(12) A. S. Wiener: I. B. Wexler and E. Gamrin: "Hemolytic Disease of the Fetus and the Newborn Infant with Special Reference to Transfusion Therapy and the Use of the Biologic Test for Detecting Rh Sensitivity", *American Journal of Diseases of Children*, Volume LXVIII, November, 1944, page 317.
(13) G. C. Dockeray and H. Sachs: "Rh Antibodies in the Maternal Circulation without Clinical Manifestations of Erythroblastosis in the Child", *The Journal of Immunology*, Volume XLVIII, 1944, page 241.
(14) A. S. Wiener: "Rh Factors in Clinical Medicine", *The Journal of Laboratory and Clinical Medicine*, Volume XXIX, November, 1944, page 973.

Reviews.

PHYSICAL ANTHROPOLOGY.

MEDICAL MEN especially interested in some branches of anthropology, though they may not be professional or trained anthropologists, will read "An Introduction to Physical Anthropology", by Professor Ashley Montagu, with much interest and considerable profit.[1] It has been written "with the object of providing those who wish to learn something about the subject-matter of physical anthropology with a brief means of doing so". The author has succeeded in his object. A feature of the book is the list, at the end of each chapter, of works to be consulted for further reading.

In a chapter on the primates as a zoological group, the author gives a short account of the lemurs, tarsiers, monkeys, apes and man from the point of view of physical anthropology in man. Chapter III is on the origin and evolution of the primates presenting the fossil record leading up to man's evolution, Wood Jones's "Man's Place Among the Mammals" being in the list of books to be consulted. This is followed by a chapter entitled "The Origin and Evolution of Man" describing the fossil remains of man and his immediate predecessors, the Kellor skull being considered of "the greatest significance" as being almost identical with that of Wadjak man of Java. The next two chapters deal with the ethnic groups and divisions of man and the author emphasises the difficulty of differentiating "races" of men from each other. The blood groups are here discussed. A table is given of these divisions and ethnic groups.

The author now passes to quite another aspect of his subject, "the relation between body, mind and culture" and "heredity and the influence of the environment upon man". He seems to doubt whether there are any substantial mental differences between the varieties and ethnic groups of man. In this he lays very much greater stress on nurture than on nature, on the environment to which the developing human is exposed than on his genetic make-up. The great mental and spiritual differences that may exist between persons "not of the same family, economic or class group, nation, or ethnic group" are due, he holds, to differences in culture and cultural experience. "These differences have no known or demonstrable connection with the genetic system, although it would be unjustified to assume that they are entirely unconnected." Had the reader and the author "been born and brought up among a group of Australian aborigines they would now be, culturally and mentally, Australian aborigines, though physically they would each remain members of their own ethnic group". We feel that Professor Montagu, in spite of being supported by many authorities whom he quotes, has laid undue importance on nurture at the expense of the genetic make-up. There can be no question that many mental traits—mathematical ability, musical genius, capacity to rhyme, disposition (gentle, passionate), educability, ability to see a thing through—have a genetic basis on which culture builds. The genes themselves vary over periods of time—as witness the physical differences between races. Those that control the development of the mind must do likewise. The white man brought up in the way suggested would doubtless be very nearly culturally and mentally an Australian aboriginal, but not quite. He would have mental urges and expressions that the native had never experienced, as the latter would have some that he would not possess. Examples of the reverse picture, of full-blood Australian aboriginal children brought up in European homes, are still amongst us and would well repay study. While we apologize for quoting it, and do so with no derogatory intent, there may be something in Bunyan's allegory: "They saw one Fool and one Want-wit washing of an Ethiopian with intention to make him white, but the more they washed him, the blacker he was."

[1] "An Introduction to Physical Anthropology", by M. F. Ashley Montagu; 1945. Springfield, Illinois: Charles C. Thomas; Sydney: Angus and Robertson. 8½" x 5½", pp. 339. Price: $4.00.

The importance of the study of twins is stressed. Under the subheading "Constitution and Crime", Professor Hooton's declaration that the primary cause of crime is biological inferiority is criticized. Under "constitution" are considered Kretschmer's three morphologic types, the pyknic, athletic and asthenic, and Sheldon's endomorphic, mesomorphic and ectomorphic components. The effects of climate and socio-economic factors and food in altering man's measurable physical characters are discussed. Under "Sex Differences in Constitution", the statement that "deaths from all causes are greater in males than in females at all ages" must surely be a slip, even though more male children than female are born. In the table on page 238 of "Sexual Differences in Susceptibility to Disease" from Draper, several misprints occur and "continued sclerosis" is evidently combined sclerosis. An appendix gives the methods of measurement in physical anthropology.

We have found this work interesting and stimulating, and feel that we can recommend it to medical men who desire, and there must be many such, an introduction to physical anthropology along the broad lines here discussed. The author not infrequently uses a comma where a semi-colon or full-stop should be employed. A protest should be made against the publisher's statement on the fly-leaf that "reproduction in whole or in part in digests, in condensation of the literature, in lectures, or in films; or by multigraphing, lithoprinting, or by any other processes or devices, is reserved by the publisher". The book itself is full of quotations, digests and condensations from the literature. If the publishers desire a ready sale they should encourage the very things they reserve.

CONVULSIVE THERAPY.

A POTPOURRI of facts, findings and fancies, "Shock Treatments and Other Somatic Procedures in Psychiatry", by Lothar B. Kalinowsky and Paul H. Hoch, is more a book of reference for those experienced in these methods of treatment than for the tiro in psychiatry.[1] It is probable that the authors purposely refrain from a clear exposition of techniques which would enable a beginner to embark upon these forms of treatment, as they rightly contend that training under the direction of an experienced therapeutist is most necessary. This is perhaps less so in electro-convulsive therapy than in insulin coma therapy, as the latter demands experienced judgement to avoid the many and grave complications that are likely to be met.

The authors discuss principally insulin coma treatment, and pharmacological and electroconvulsive treatment. It is interesting to note that in the text they recognize that the term "shock treatments" popularly applied is a misnomer, yet in the title of the book they perpetrate the same error. Most of the work consists of results culled from the literature and is presented uncritically, the reader being left to draw his own conclusions. The conclusion is inescapable that convulsive therapy is the treatment of choice in all endogenous disorders, including schizophrenia.

In regard to prognosis, it is not adequately emphasized that, irrespective of the diagnosis, the ultimate result of this form of therapy may be gauged by the amount of affective disturbance and is therefore minimal where there is emotional loss.

One definite error occurs on page 103, where it is stated that in "Cardiazol" therapy, if no convulsion occurs in one minute after the injection, subsequent injections of one millilitre are given. Actually it is necessary to give a second injection consisting of the original dose *plus* one millilitre.

Other forms of somatic treatments, such as continuous sleep, refrigeration and pharmacotherapy, are briefly considered and rightly dismissed as being inferior to the coma and convulsion.

The indications for and results of prefrontal lobotomy are presented sufficiently fully to suggest that this treatment has a definite position in the armamentarium of the psychiatrist. It should be noted that as yet no reports of this operation have been forthcoming from the mental hospitals of this country.

Finally, this book is recommended to any general practitioner who may be in need of reassurance as to the efficiency and safety of these treatments after reading the somewhat emotional correspondence which recently appeared in the columns of the *British Medical Journal*.

[1] "Shock Treatments and Other Somatic Procedures in Psychiatry", by Lothar B. Kalinowsky, M.D., and Paul H. Hoch, M.D., with a foreword by Nolan D. C. Lewis, M.D.; 1946. New York: Grune and Stratton Inc. 8½" x 5½", pp. 308. Price: $4.50.

The Medical Journal of Australia

SATURDAY, AUGUST 17, 1946.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

SOME RECENT BRITISH MEDICAL ASSOCIATION HAPPENINGS IN ENGLAND.

DURING the last few weeks a good deal of space has been devoted to the developments that have taken place in England in connexion with the National Health Service Bill. It is true that most of the facts recorded have been in the nature of advance information, for after a period of six or seven weeks members of the Association can read full accounts of happenings in the pages of the *British Medical Journal*. There is an advantage, however, in the recording of events as soon as possible after they have happened. This week we publish some of the most interesting items from the report of the Annual Representative Meeting that was held in London on July 23, 24 and 25, 1946. The most important subject mentioned is the attitude of the representatives to the National Health Service Bill. Readers will remember that the White Paper issued by the British Government in connexion with the bill was published in full in this journal and that a short account was also given of the special Representative Meeting held on May 1 and 2, 1946, to consider the bill and the Council's recommendations in regard to policy. Readers will also recall the fact that Dr. J. G. Hunter, General Secretary of the Federal Council, went to England to represent the Australian Branches at that special meeting. On the subject of the bill it is clear that the Chairman of Council, Dr H. G. Dain, gave a stirring address. The result was that the meeting decided to stand by the decision of the special Representative Meeting to withhold support from the bill. The special meeting gave its general approval to the Council's report on the Government's proposals for a national health service. It declared that the bill in its present form infringed the seven principles laid down by the Negotiating Committee on behalf of the whole profession, but it determined to support the Council of the Association in any action that it might take to secure the necessary amendments of the bill. The bill has passed its third reading without being altered in any important particular. It has now to go to the House of Lords. Whether this august assembly will make any drastic alterations remains to be seen. Many people think that this is unlikely; although the Opposition did oppose the third reading of the bill. It is interesting to note that a referendum is to be taken by the British Medical Association among members of the profession throughout the country and that members will be asked to indicate their attitude towards acceptance of service under the act. This is an important step, because if the profession as a whole decides that it will not accept service the Government's scheme will fail. And, of course, all governments know this. It is to be hoped that when a referendum is taken members of the profession will cooperate. Experience in Australia shows that doctors in this country at least do not take kindly to such inquiries. If the members of the profession really believe that their freedom is at stake—and the British Medical Association firmly believes that it is—they will take part in the referendum so that those who are trying to act for them will be able to estimate their forces and lay their plans. In the meantime no doubt the Minister will go ahead with his preparation of the administrative machinery, and we understand that already certain practitioners have been approached and asked whether they are willing to act as members of regional boards. The resolution of the Annual Representative Meeting and its view of the ethical behaviour of any who might be tempted to accept positions on these boards may act as a deterrent.

The reference in the report of the Annual Representative Meeting to the capitation fee under the present *National Health Insurance Act* is interesting. Apparently the Minister is not prepared to allow the findings of the Spens Committee (see THE MEDICAL JOURNAL OF AUSTRALIA, June 8, 1946) to settle the question of the capitation fee. He has, however, expressed his willingness to have a further conference with the Insurance Acts Committee. It looks as though he may consent to an increase in the fee. From his point of view it would, of course, be good tactics to do this.

Reference was made to the relationship between the Parent Body and the Medical Association of South Africa, which has recently "cut the painter" and become an independent body in affiliation with the British Medical Association. The result of the proposals which were accepted by the Representative Meeting will be the creation of a new class of membership of the British Medical Association. Under the new arrangement membership of an association affiliated to the British Medical Association would *ipso facto* constitute affiliated membership of the British Medical Association. An affiliated member would be under no liability in regard to subscriptions to the British Medical Association; he would be accorded the privileges of an ordinary member of the Association with two exceptions—he would not receive the *British Medical Journal* and he would not be allowed to vote at meetings of local units. Another clause in the affiliation proposals states that unattached members should not have the right to form a Branch of the British Medical Association within an area in which the Medical Association of South Africa operates, and *vice versa*. Though many members of the British Medical Association in Australia regret the severance of the corporate link between Britain and South

Africa, there is some consolation in the fact that under the proposed conditions the liaison between the members of the profession in the two countries (and naturally also between South Africa and Australia) will be close.

On the purely scientific side an important advance will shortly be made. The Association has determined to issue at the beginning of next year two new journals consisting of abstracts of world medical literature. One journal will deal with medicine and the other with surgery, gynæcology and obstetrics. This venture will necessitate the appointment of a special staff. An editor has been appointed in the person of G. W. M. Findlay, C.B.E., M.D., D.Sc., M.R.C.P. We understand that Dr. Findlay has been associated with the Wellcome Research Institute. The assistant editor is to be S. B. Gilder, B.Sc., M.R.C.S., L.R.C.P. Dr. Gilder has been a prisoner of war, and during his internment became proficient in several European languages. This news will be received with great satisfaction in this country. There is scope for British journals of this kind, and we may confidently predict that both publications will have a useful future.

Current Comment.

SANDALS AND HYGIENE OF THE FEET.

THE vulnerability of the human foot is always emphasized by war. Troops in hot and humid climates provide many problems on this score alone, though after all it is but the familiar problem of infections and hyperhidrotic troubles of the feet in civilians, stated with greater urgency and frequency. An interesting experiment has been carried out on 2,000 men in an army air field in the United States of America. Lieutenant W. J. Nickerson, Lieutenant-Colonel L. Irving and Major H. E. Mehmert, representing the Sanitary Corps, the Air Corps and the Medical Corps, report on the results of supplying 2,000 men with a standard type of sandals, observations being made of the condition of their feet over a period of two months.[1] They quote 80% as the proportion of army and navy personnel who suffer from some type of infection of the feet, and place the civilian figures at approximately the same level. This does not imply that the civilians have the same degree of trouble, of course, as their circumstances are so different. These writers seem to assume that fungous infections are the cause in most cases, and speak of the difficulty in obtaining fungicidal action with the preparations available without causing irritation. They also remark that there is no specific remedy. It is only fair to point out that the diagnosis of "tinea" often rests on a very slender foundation, and indeed is an assumption only in many cases. It is also a fact that far too many powerful antiseptics and fungicides are used on infected feet. Eczematization is thereby favoured and cure delayed. But this is by the way, for the purpose of the experimental issue of sandals was to see if the lessening of sweat soakage thus obtained would also lessen the incidence and severity of infections. As might have been expected, a definite improvement was found. A preliminary trial of twenty pairs of sandals was made, and the effect of the increased aeration of the feet was sufficiently good to warrant the trial being repeated with larger numbers. The actual incidence of infections of the feet was greatly reduced, falling from 78% in a parallel series of men wearing shoes to 35%. The latter group showed 28% of men with severe infections, whereas the group wearing sandals had only 3·5%. The types of clinical affection of the feet recognized were a mild scaling with redness and a few minor fissures, moderate scaling with sodden patches and vesicles and fissures with some degree of tissue change, severe changes of the same kind, and finally intensely eczematized lesions with severe tissue affection. The numbers of cases seen illustrating each group were much reduced by the wearing of sandals, as opposed to issue shoes. The sandals supplied were of a strong though open pattern, and good protection to the toes was afforded. A single leather thong and buckle secured the foot-gear, which was sometimes worn with socks, but apparently usually without socks by the the majority of the men.

It is, of course, evident that there would be great difficulty in following this plan under conditions other than those usually found in base units, and incidentally one can imagine the reception that such a suggestion would have with most quartermasters' departments and business boards. Leaving on one side the discussion of the actual microbic cause of infections of the feet, there is no doubt that they are, as these authors remark, one of the diseases of civilization. Sandals would probably not be favoured by all people, but in point of fact there would be much less infection of the feet if reasonable hygiene were observed. In armies it is admitted that the conditions are entirely different: the sources of infection are multiplied, the opportunities for care are not always abundant, and the type of foot-gear worn is in itself different. But this is an interesting observation which may help to remove the idea not yet extinct that the answer to the problem is the old trial of strength, skin *versus* fungicide. Perhaps a cynic might say that the sandals' success was due in part at least to the greater social incentive to more frequent washing of feet thus exposed for inspection; even so, this in itself is laudable.

[1] *Archives of Dermatology and Syphilology*, November-December, 1945.

SUNBURN AND WAVE-LENGTHS.

IN Volume XXV of *Physiological Reviews* appearing in 1945, H. F. Blum gave an admirable summary of investigations to date on the reaction of human skin to ultra-violet light. Since then Blum and his collaborators have carried on the investigations, and new facts have been revealed. Certain elementary physical data must first be considered. The visible spectrum extends from wave-lengths about 8,000 Ångström units, or more concisely put 8,000Å, in the red to 3,800Å in the extreme violet. Beyond this latter we have the ultra-violet, but not until the wave-lengths are 3,130Å does the radiation produce skin reaction; in other words at 3,130Å the erythema spectrum begins. In sunlight there is practically no radiation with wave-lengths below 2,900Å, whereas that from the sources of ultra-violet light usually employed extends to 2,300Å. The events which follow exposure of the skin to ultra-violet radiation may be summarized as follows: (*a*) erythema restricted to the area exposed and appearing rapidly, that is, half an hour after exposure; (*b*) œdema, perceptible only with severe doses and reaching its maximum about the second day; (*c*) erythemal flare, also following heavy dosage, and extending irregularly in unexposed skin areas; (*d*) desquamation varying from a mild flaking to true blistering; (*e*) pigment formation occurring only after several days and varying with the intensity of the dose; (*f*) darkening of pigment already present and commencing immediately after exposure. The latest discovery by Blum and his collaborators is that the radiant energy in the erythema spectrum with longer wave-lengths, that is from 3,130Å to 2,970Å, actually inhibits erythema, whilst the wave-lengths below this have no inhibitory action.[1] The mechanism of this curious operation Blum has not been able to discover, but the finding fits in with observations made by other investigators, for example, in sunlight the longer wave-lengths of the erythema spectrum abound and sure enough sunlight has nothing like the erythema-producing power of various arc lights. The shorter wave-

[1] Harold F. Blum and William S. Terus: "Inhibition of the Erythema of Sunburn by Large Doses of Ultraviolet Radiation", *The American Journal of Physiology*, Volume CXLVI, April 1, 1946, page 97; "The Erythemal Threshold for Sunburn", *ibidem*, page 107.

lengths are trapped by the horny layer of the epidermis, while the longer pass down to the Malpighian layer, and it is here that the inhibitory apparatus develops. Blum with his collaborators has also investigated the value of protective measures against sunburn, such as painting the skin with a solution of phenyl salicylate.[1] The research has been conducted with all the rigour of a piece of pure physics, with complicated integral equations; but the general outcome is that conditions are too variable to permit generalizations to be advanced. Individual responses are widely divergent as to both penetration by the ultra-violet light and the reaction of the epidermal tissues and the blood vessels. Perhaps the greatest factor in bringing about these discrepant results is the varying thickness of the horny layer of the skin. It is certainly rather curious that in this and in similar investigations no notice is taken of the very obvious fact that long exposure to sunlight never produces inflammatory reaction in the bed of nail or toe; in fact, as can be readily shown with a Hilger quartz spectrograph, nail substance is a far better filtering screen for ultra-violet light than Crookes glass. Other results of this research are that white fabrics provide less protection than khaki-dyed fabrics of comparable weave. When a fabric is wet its protective value is reduced, especially against polychromatic, that is, white light, and this is obviously due to reduction in scattering. Of the research as a whole it may be said that it is pleasant to find an investigator following the best traditions of mathematical physics, but candidly admitting the supremacy of physiological factors when he encounters them. The main aim of the investigation was to find a protection against sunburn which could be supplied to life boats and emergency rafts. If the authors have not come to a straight-out recommendation, this is no fault of theirs, but is due to the high variability of individuals. That the study of various pathological conditions following insolation will be benefited by these and similar researches is evident.

[1] Harold F. Blum, Maynard Eicher and William S. Terus: "Evaluation of Protective Measures against Sunburn", *ibidem*, page 118.

THE COMPILATION AND USE OF INDUSTRIAL ACCIDENT RECORDS.

ACCIDENTS and their prevention have been discussed in the pages of this journal on many occasions. They have been discussed from the point of view of their effect on the individual and also of their effect on industry. It is with the first aspect that the practising doctor is chiefly concerned. The industrial medical officer has to consider both points of view. But, however accidents are regarded by practitioners of medicine, all will agree that they should be prevented. The Commonwealth Department of Labour and National Service is concerned about accidents in industry because the time lost is expensive to both employees and employers; it has therefore issued a booklet describing a system for the compilation of industrial accident records. The department states that the time lost because of industrial accidents is reflected in unduly high costs in many Australian industries. This is a somewhat naïve statement. Industrial accidents no doubt have some effect on high costs in industry, but there are other much more potent causes which people of every political colour can readily name. Be that as it may, we may agree with the department that in view of the various circumstances which bring accidents about, these circumstances must be known and their importance assessed if the number of accidents is to be reduced. This means that records of all accidents must be kept in such a way that they will at once provide useful information and statistics capable of comparison. At present the prevention of accidents is hampered because no uniform system of keeping records is in general use in Australia. The department's brochure contains the full description of a system which has been devised for use in Australian industry. Its compilers have followed the standard methods published by the Royal Society for the Prevention of Accidents in the United Kingdom and the National Council of Australia. These in turn comply with the recommendations of the International Labour Office. While we do not suggest that medical practitioners in general should become familiar with the details of this system, they should know that it exists and should understand that it is complete; they will doubtless have opportunities for reference to it in their conversations with industrialists, employers and employed. Industrial medical officers should obtain a copy of the brochure and study it.

The record of an individual accident should give details concerning the injured person, his work, the time and place of the accident and the injury. Further, some indication should be given of the circumstances of the accident, how the injury was caused and why the accident occurred, as well as the actual time lost. Clearly among the questions to be considered will be the action, the machine or the process by which the injury occurred, the condition of the plant and the mental and physical state of the injured person. Observations may have to include persons working with the injured worker and the possible irresponsibility of anyone concerned. At the time of an accident it may not be possible to determine what information will be significant. For this reason all possible information should be included. The department believes that the task of preventing accidents is best regarded as a problem of management. For this reason a register must be kept and someone must be responsible for keeping it. The person in charge of the register must be someone on whom reliance can be placed, but difficulties will often be experienced. It is pointed out that the cause of the accident may be the most difficult item to record with accuracy. This will be clear from consideration of the "standard causes" mentioned: ineffective guarding, defective or inadequate materials or equipment, faulty plant design and faulty practice, bad housekeeping, inadequate lighting, inadequate ventilation or heating, failure to provide rules, failure to instruct, incorrect dress, breach of rules, carelessness, skylarking, inexperience, unsuitability, fatigue, physical or mental condition. Finally the system, once introduced, must be used intelligently, and action must be taken when defects are discovered.

In discussions on industrial hygiene we have always insisted that the best results will not be obtained unless the management and the staff are prepared to cooperate. Both employer and employed have something to gain by a freedom from accidents, and no system will succeed, however much it is recognized as a problem of management, without the understanding and goodwill of everyone concerned. In the matter of accident causation alone this will be evident, for a non-cooperative staff of workers will frustrate attempts of the management to discover all that should be known. The department's brochure is an academic production intended no doubt for academic use. It is a pity that the human side finds no place in its pages.

A QUARTERLY REVIEW OF PÆDIATRIC LITERATURE.

THE Washington Institute of Medicine has decided to issue a new journal, *Quarterly Review of Pediatrics*. It will appear in the months of February, May, August and November, and is intended "to make it feasible for the busy physician to keep abreast of the most recent progress in all branches of pediatrics with a minimum of time and effort". The journal will also serve as a guide to original sources when more detailed information is desired. The first number shows that the abstracts are grouped conveniently under suitable headings. Comments are added to the abstracts when thought desirable. Dr. Irving J. Wolman, of the Children's Hospital, Philadelphia, is Editor-in-Chief. He has the assistance of a board of sixteen from well-known American medical schools. The abstracts in the first number are almost entirely taken from American journals; a few British papers have been used. Australian pædiatricians will do well to consider use of this new source of information.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Treatment of Gas Gangrene with Penicillin and Antitoxin.

F. P. O. NAGLER (*The British Journal of Experimental Pathology*, February, 1945) has evaluated the treatment of experimental gas gangrene due to *Clostridium welchii* with penicillin and antitoxin. Two strains of toxin-producing *Clostridium welchii* proved sensitive to penicillin were used to produce infection in guinea-pigs. Treatment with either or both methods was begun six hours after inoculation. None of the control untreated animals survived, while 7% of each of the groups receiving one treatment alone recovered. When penicillin and antitoxin both were used, 73% of the group survived. The dosage of penicillin given corresponded weight for weight to a human dosage of up to three million units, and of antitoxin, 150,000 units.

Effect of Penicillin on the Treponema Pallidum.

F. R. SELBIE AND R. D. SIMON (*The British Journal of Experimental Pathology*, December, 1944) have studied the effect of penicillin on *Treponema pallidum* infection in rabbits. They inoculated the animals and waited until lesions were 1·0 to 2·0 centimetres in length, and on aspiration showed active treponemata. Penicillin treatment was then carried out by intramuscular injection, and the rate of disappearance of organisms from the lesions was studied. A dose of 4,500 units of penicillin per kilogram would cause the disappearance of organisms from the lesions within twenty-four hours, but in nine of fifteen animals they reappeared thirty-six to forty-eight days later. One rabbit proved entirely resistant to treatment. Much higher doses were required to produce curative effects. The authors discuss the type of rabbit lesion, large in size and dense in consistency, also the high rate of excretion of penicillin in the rabbit. They point out that these factors made deductions applicable to human disease very difficult. They conclude that serological control of relapse would still permit penicillin to be a valuable adjuvant to other methods of treatment of syphilis.

Bacterium Coli Neapolitanum in Summer Diarrhœa of Infants.

JOHN BRAY (*The Journal of Pathology and Bacteriology*, April, 1945) has studied the bacteriology of 51 samples from artificially fed infants under the age of one year, paying attention to lactose-fermenting organisms as well as the accepted pathogens. In 18 of 20 fatal cases autopsy was performed, and the organs showed fatty degeneration of the liver, and dilatation and capillary engorgement of the intestine as the chief lesions. The commonest organism recovered was a non-motile, lactose-fermenting, Gram-negative rod which produced acid and gas from salicin and sucrose; and a slow fermentation of maltose-specific anti-serum agglutinated 45 of the strains to a titre of 1 in 1,600, but did not agglutinate similarly fermenting organisms isolated from children who were well. The serum of ten patients was tested against this organism, but no significant rise in antibody could be demonstrated. A characteristic spermine-like smell was said to be associated with the presence of the organism. Four of the patients also harboured *Bacillus dysenteriæ* Sonne. The author makes no claim for this organism in the ætiology of summer diarrhœa.

Coagulated Plain Serum for Corynebacterium Diphtheriæ.

G. B. FORBES AND C. KIRKWOOD LANE (*The Journal of Pathology and Bacteriology*, July, 1945) have tested coagulated plain serum ("C.P.S.") as a differential medium for *Corynebacterium diphtheriæ*. They compared a standard Löffler's medium, Hoyle's tellurite medium, and coagulated plain serum slopes, inoculating the same swab on all three. In 100 swabs from which *Corynebacterium diphtheriæ* could be recovered by one or other means, 99 gave positive results on the tellurite, 98 on "C.P.S." and 74 on the Löffler's medium. The authors state that the plain serum medium gave "normal" morphology and the growth on the medium was more profuse than on Löffler's medium. Thirty-three strains were classified as *gravis*, 26 as *intermedius*, and 41 as *mitis*. No one strain appeared to be selected on the medium.

Antituberculosis Activity of Aspergillic Acid.

ANDREZ GOTH (*The Journal of Laboratory and Clinical Medicine*, November, 1945) has investigated the antituberculosis activity of aspergillic acid and its probable mode of action. The substance was prepared from cultures, purified with charcoal, and used as the sodium salt, to test its effect on a fast-growing strain of *Mycobacterium tuberculosis*. When it was added to broth in a dilution of 1 in 80,000 there was complete inhibition of growth of the test organism, but when the experiment was repeated in Long's synthetic medium containing 0·05% ferric ammonium citrate, no inhibition was shown, even when the concentration was raised to 1 in 20,000. If the iron salt was omitted from the medium, however, inhibition was exerted at the dilution of 1 in 20,000. Similar results over a different time range were observed with a dysgonic strain. A mixture of the iron salt and aspergillic acid showed a precipitate, which could be filtered off, leaving a filtrate which did not give the Prussian blue reaction. The stimulating effect of ferric ions on the growth of *Mycobacterium tuberculosis* is removed by salts of aspergillic acid which precipitates them, thus preventing their growth-stimulating action.

Phagocytic Action in Anæmia.

J. B. BERRY, JANE DAVIS AND T. D. SPIES (*The Journal of Laboratory and Clinical Medicine*, November, 1945) have studied the phagocytic action of neutrophile leucocytes in anæmia. They mixed heparinized blood with a standard suspension of *Micrococcus candidus*, and held the mixture in a water bath at 37° C. for four minutes. They then stained films and counted the number of organisms ingested by each phagocyte, and compared the results with those of normal blood treated similarly at the same time. They tested 29 samples of blood from patients with varying degrees and types of anæmia, and results showed that the leucocytes from the anæmic patients displayed up to three and a half times the average activity of the normal leucocyte, and this disappeared as the blood picture returned to normal. The physiological basis for this enhancement of phagocytic action in anæmias could not be explained.

Non-Mannitol-Fermenting Dysentery Bacilli.

J. D. MACLENNAN (*The Journal of Pathology and Bacteriology*, July, 1945) has studied 304 strains of non-mannite-fermenting dysentery bacilli isolated from patients with diarrhœa or dysentery in the Middle East. Cultures were studied during three weeks of aerobic incubation in a variety of media. Agglutination tests were performed for final identification. Anti-serum was made from some strains. No less than 67 of the strains submitted proved to be Proteus in which motility was often difficult to demonstrate. Twenty proved to be variants of the Flexner-Boyd groups. Two hundred and seventeen remained to be identified, and fell into three groups—one producing indole, one not producing indole, and one producing acid in dulcitol. Agglutination tests confirmed this grouping in all instances except that of two strains called McDiarmid and Q771. A new serological type called P25 was established. All the cultures were obtained from patients, and none came from cooks or food handlers. The author suggests an extension of classification of the non-mannitol-fermenting dysentery bacilli which he thinks should now be possible.

Intestinal Parasites in Dutch New Guinea.

R. B. BURROWS (*The American Journal of Hygiene*, November, 1945) has made a survey of intestinal parasites among natives in Dutch New Guinea. These were 345 villagers, some of whom had been prisoners in Japanese hands and had worked in their labour lines, so that their nutritional state had been poor. Papuans, Indonesians and Chinese were examined. Only 3% of the total number were entirely free of intestinal parasites, and the majority harboured more than one type. Hookworm was present in 86%, ascaris in 54%, trichuris in 39% and strongyloides in 9%. Racial variation was considerable; those groups not wearing shoes in particular were more heavily infested. The age group showing the highest incidence was ten to nineteen years. The previous living habits of the groups are discussed in relation to the incidence of infection.

Pleuropneumonia-Like Organisms in Chick Embryos.

W. VAN HERICK AND M. D. EATON (*The Journal of Bacteriology*, July, 1945) have found an unidentified pleuropneumonia-like organism during passages in chick embryos. They were passing a strain of the virus of atypical pneumonia, and they found a sudden increase in the death rate of the embryos, an alteration of the virulence of the passage fluid, in that it became increased for the cotton rat

and disappeared for the hamster. Microscopic examination revealed the presence of elementary bodies readily stainable by the Giemsa method and poorly by the Gram method. The agent was isolated from one embryo, and behaved in most respects like the pleuropneumonia organism, being cultivable in 10% horse serum, in 0·5% glucose broth and on 10% serum agar plates. It agglutinated chicken red cells, and the agglutination was specifically inhibited by homologous rabbit antiserum. A large number of chicken sera were obtained from birds at the hatchery that furnished the eggs from which this agent had been isolated, and they inhibited hæmagglutination by the agent. A filtrable substance could be obtained from the agent which caused lung œdema in rats, but the organisms could not be isolated from animals which had died. The agent was filtrable through Berkefeld filters, but not through Seitz disks.

Types of Eberthella Typhosa.

JANIE F. MORRIS, ALICE BRIM AND T. F. SELLERS (*The Journal of Infectious Diseases*, July-August, 1945) have studied the types of *Eberthella typhosa* found in Georgia during the four years 1941-1944. They adopted the simplified phage classification of Craigie for separating the V form of the bacillus into α, β and γ groups. Individual infections to the number of 845 were studied and 652 were successfully typed. Types A, E and C were the most prevalent and constituted 71·8% of the whole. In a localized outbreak of typhoid fever in a village where water from a mill was found to be responsible for its spread, many cultures from each of the eighty patients were investigated, and all proved to be type A. A series of carriers of *Eberthella typhosa* were also tested and 59 cultures were successfully typed, while thirteen strains could not be identified by this means. The authors stress the value of phage typing in tracing the source of outbreaks of typhoid fever.

HYGIENE.

Chronic Disease.

EDWARD S. ROGERS (*American Journal of Public Health and the Nation's Health*, April, 1946) holds that the continuance of the present inadequate facilities for the care of the chronically ill constitute a condemnation of the present social system. With the definition of chronic disease as a chronic pathological condition, disabling or non-disabling, known to the patient and with symptoms recognized for at least three months, the National Health Survey showed that one in every five persons has a chronic disease, one in every eighty is permanently disabled (the disabling conditions not including tuberculosis or mental disease), and three-fourths of all chronic disease occurs in persons at the wage-earning ages fifteen to sixty-four years. Chronic illness is not confined to any class, and the needs of everybody must be met. Chronic disease might be limited to diseases requiring extended supervision, medical, hospital *et cetera*. Its care is inseparable from the medical, preventive and health services needed by all. First, districts should be defined and hospital and health facilities integrated. Three levels are required, diagnosis and treatment, skilled nursing, home care. In the chronic disease hospital patients would be retained for short periods for diagnosis and treatment and for longer periods for rehabilitation. Nursing care may be in decentralized nursing infirmaries. Diagnostic consultation and follow-up clinics should also be provided. Joint planning by all these services is essential.

The Control of Typhus in Italy in 1943-1944 by Use of DDT.

CHARLES M. WHEELER (*American Journal of Public Health and the Nation's Health*, February, 1946) states that for fifteen years Italy had been free of typhus, but in July, 1943, a case was reported. With the cold weather the number of cases rose to 371 in December. Naples had a population of over 750,000 undernourished and hungry persons in congested unsanitary conditions. With the air-raid alarms they poured into huge limestone caverns and small concrete shelters. In these, patients suffering from typhus and corpses were found. Lousiness was widespread and intensive, bathing facilities were nonexistent and medical services were chaotic. Case finding was thoroughly organized. Anyone with a rise of temperature was placed under observation, and if suspected, isolated. Contacts at home, in institutions and in air-raid shelters were dusted with DDT. Hand powder dusters forcefully blew the powder between the layers of clothing and between the skin and the under-clothing. The nozzle was inserted up the sleeves, down the neck, front and back, round the waistline and into the crutch. Hair and any cap or hat was thoroughly dusted. A fortnight's protection resulted from one to one and a half ounces of 10% DDT powder per person. Beds and bedding in shelters were treated. Mass delousing was undertaken in forty operating stations equipped to dust thousands of persons a day followed by house-to-house dusting. Flying squadrons dealt with surrounding villages. A month later, by January 10, a sharp decrease occurred, and by February 10 the epidemic was broken. Naples had 1,404 cases and outside Naples 510 cases occurred. Over three million dustings were carried out.

An Epidemic of Scrub Typhus.

C. B. PHILIP AND G. M. KOHLS (*American Journal of Hygiene*, September, 1945) discuss an epidemic of scrub typhus which occurred on South Bat Island (Purdy Group), forty-six acres in extent, covered with coconut palms with some undergrowth, with a dense scrub ten feet high round the beach margin. A few pigs live there, but had no mites. A fruit bat living in the treetops and many rats, *Rattus concolor browni*, were the only native mammals. *Aëdes scutellaris* was the only mosquito. Three species of Trombiculid mites were taken: *Trombicula deliensis* (*Trombicula walchi*) on rats (ears), *Schöngastia pusilla* in boot collections, also *Neoschöngastia* on a ground bird. Mites scraped off the ear of the rat were pooled and were injected intraperitoneally into white mice. In two mice, bodies like *Rickettsia orientalis* were found in the peritoneal washings and kept going through twenty-nine generations. Nine out of ten guinea-pigs died with the rickettsial infection. Mice died in 5·5 days on the average. In forty-six days 26 cases of scrub typhus occurred among 41 soldiers; many were seriously ill and two died. The few who slept in hammocks at night escaped. Rats abounded everywhere at night. Repellent used in the party in addition to impregnated clothing proved an effective protection.

A Study of Nutritional Conditions in a Group of Urban Children.

H. J. LEESON *et alii* (*Canadian Journal of Public Health*, March, 1946) report that in 1944-1945 two groups of school children were studied at Hamilton. One hundred were classed as underweight by the School Medical Service and 100 as average or overweight. Besides the making of an inspection, hæmoglobin was estimated and food habits were recorded. Of the underweights, 83% were graded as undernourished, of the controls 19%. Underweight alone was not regarded as final, but only when associated with failure in muscle tone and posture and evidence of fatigue. In both groups similar findings were noted: dental caries, 30%; enlarged thyreoid in girls, 26%; gingivitis, 40%; cheilosis, 11%; hyperkeratosis, 39%; and red tongue, 20%. Hæmoglobin was surprisingly low; 42% had a percentage below 80. No correlation was noted between the grading of nutrients employed and the physical condition. Fruit was in spasmodic supply and the consumption of vegetables surprisingly small. Good breakfasts were followed by good lunches, and those who had poor breakfasts did not compensate for their lack by eating a good noon meal. Many, however, had only one substantial meal a day.

The Present Status of Vaccination against Influenza.

RONALD HARE (*Canadian Journal of Public Health*, March, 1946) states that effective immunization of mice can be obtained against a human influenza virus very fatal to them. In a human population two distinct strains A and B occur without cross immunity. Further antigenic differences are met with in strains from these. The chick embryo in its shell is used, and after injection the allantoic fluid is rich in virus in forty-eight hours. Inactivated by formalin, one millilitre injected raises the titre from, say, 37·5 to 244 two weeks later. With concentrated virus this effect can be doubled to about 490, higher than the level after actual infection. A Sharples centrifuge rotating at 40,000 per minute will remove most of the virus in about an hour. Success has been obtained by freezing and allowing slow melting to occur. The precipitate of urates and protein adsorbs most of the virus and is readily separated. A third method is to rupture a few blood vessels to allow blood to escape into the allantoic fluid. Held in a bottle packed in ice, the red cells adsorb the virus and agglutinate in a mass. The supernatant fluid now nearly freed from virus is thrown away. Saline solution at 37° C. in two hours takes up the virus from the cells and is then formalized. Human tests were carried out in about 6,000 cases with 6,000 controls; influenza occurred in 2·2%, as against 7·1% in controls.

Bibliography of Scientific and Industrial Reports.[1]

THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided that a large proportion of the results of this research should now be released for general use.

The United States Department of Commerce, through its "Publication Board", is now issuing abstracts of these reports in the form of a "Bibliography of Scientific and Industrial Reports". The complete bibliography is being received in Australia, and extracts likely to be of interest to readers of this journal will be reproduced as far as practicable each week.

The original reports may be obtained in two ways: (a) Those marked with an asterisk may be obtained by approved applicants without cost on making application to Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 203, Collins Street, Melbourne, C.1. Copies are available for reference in public libraries. (b) In other cases microfilm or photostat copies of the original report may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Readers desiring to avail themselves of this service should send the Australian equivalent of the net United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.E.2. All other charges will be borne by the Council for Scientific and Industrial Research.

Further information on the subjects covered by the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division, Department of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

RESCH, JOSEPH A. Aeroembolism. (Army Air Forces. Experimental Engineering Section. Memorandum Report, EXP-M-49-698-7.) Off. Pub. Bd., Report, PB 5171. 1942. 6 pp. Price: Microfilm, 50c.; Photostat, $1.00.

Subcutaneous œdema of the left upper anterior chest wall following aeroembolism has been noted in two subjects after a relatively short exposure to a simulated altitude of 35,000 feet in the low-pressure chamber. In both patients the swelling of the chest disappeared after a few days, but residual pain on palpation or movement persisted for about one week. No permanent defects have been noted. Treatment was symptomatic, including the administration of heat, aspirin and rest. Detailed case reports for each subject are given in Appendix 1 and 2. Report may not reproduce well.

SALZBERG, P. L., *et alii*. Protective and therapeutic agents for war gases—solution of BAL to January 1, 1945. (OSRD Report 4888.) Off. Pub. Bd., Report, PB 5494. 1945. 92 pp. Price: Microfilm, $1.00; Photostat, $7.00.

The purpose of this study was to develop a chemically stable solution of BAL which is therapeutically satisfactory as an antidote for Lewisite contamination of human eyes. After a detailed investigation of aqueous glycol solutions of BAL, it was concluded that this system is not sufficiently stable to be used for field purposes. On the other hand, anhydrous glycol solutions have a reasonably good life under tropical storage conditions.

SMITH, PAUL K. The susceptibility of flight personnel to aeroembolism. (Army Air Forces. Experimental Engineering Section. EXP-M-54-653-44B.) Off. Pub. Bd., Report, PB 5115. 1941. 6 pp. Price: Microfilm, 50c.; Photostat, $1.00.

Officers and men, ranging in age from 21 to 41 years, in height from 65 to 74 inches, in weight from 130 to 200 pounds, were exposed to high altitudes in the low-pressure chamber to determine their suitability for missions at very high altitudes for prolonged periods of time. The results, summarized in Appendix I and II, indicate that susceptibility to aeroembolism increases with age.

SWEENEY, HENRY M. Explosive decompression—human subjects. (Army Air Forces. Engineering Division. ENG-49-695-296.) Off. Pub. Bd., Report, PB 5137. 1944. 6 pp. Price: Microfilm, 50c.; Photostat, $1.00.

The purpose of this study was to determine if it is necessary when flying at 35,000 feet altitude in large pressurized airplanes to lower the pressure differential below 7·5 psi (8,000 to 35,000 feet). It was concluded that in large bomber aircraft pressurized to 7·5 psi and in flights up to 35,000 feet altitude, the most rapid decompression rates feasible to expect will not injure the flying personnel nor cause failure in the execution of duties.

ALEXANDER, LEO. The medical school curriculum in war-time Germany. Off. Pub. Bd., Report, PB 253. 1945. 21 pp. Price: Mimeo., 25c.

Report on German medical schools: curriculum, selection of students, examinations, enrolment statistics. Notes on the Nazi influence. Part of the report is in German.

ALEXANDER, LEO. Methods for influencing international scientific meetings as laid down by German scientific organizations. Off. Pub. Bd., Report, PB 522. 1945. 32 pp. Price: Mimeo., 25c.

The investigator attaches two appendices in German: International Meetings and Foreign Politics, and Directives for the Leaders of German Delegations to International Scientific Meetings in Foreign Countries. He concludes, "these directives should be kept ready for reference for the day when Germany may again make a bid for world leadership, under the cloak of free association at first and with weapons later".

ALEXANDER, LEO. Neuropathology and neurophysiology, including electro-encephalography, in war-time Germany. Off. Pub. Bd., Report, PB 359. 1945. 65 pp. Price: Mimeo., 50c.

Extensive survey of German research in neuropathology and neurophysiology, particularly electro-encephalology. Preoccupation with the problem of infection as a result of gunshot wounds of the brain was noted (Germany did not use penicillin). Studies were also made of anoxia and severe acute fatigue states approaching sleep. An invention of great practical interest was found: a signalling apparatus for dangerous slowing of the cerebral electro-activity invented by Dr. Kornmuller. The report covers work at the following institutes: (1) Kaiser Wilhelm Institute for Brain Research. (2) Physiological Institute of the University of Gottingen. (3) *Luftfahrtmedizinisches Forschungs-Institut der Luftwaffe*. The appendix gives a list of personnel and bibliographies of the scientists interrogated. Numerous illustrations.

ALEXANDER, LEO. The treatment of shock from prolonged exposure to cold, especially in water. Off. Pub. Bd., Report, PB 250. 1945. 228 pp. Price: Mimeo., $2.00.

This is an extensive report on experiments carried out by several groups of German investigators on the treatment of shock from prolonged exposure to cold, especially in water. On the basis of these experiments, the investigators appear to have proved conclusively that for the treatment of shock produced by exposure to low temperatures, especially in water, Laptschinski's method of rapid and intensive rewarming by means of a hot bath of 45° C. is superior to any other means of resuscitation. Particularly the slow and gradual methods of gentle rewarming which had come into general use due to an erroneous interpretation of the deaths from "post-rescue collapse" endanger life by allowing an excessive "after-drop" of body temperature. Furthermore, these slow and gradual methods do not sufficiently relieve the heart from the overload in the proximal districts of circulation. The report is heavily documented.

ANDERSON, R. S., AND HUDSON, D. W. Medical research in occupied Holland. Off. Pub. Bd., Report, PB 39. 1945. 2 pp. Price: Mimeo., 10c.

Brief report on medical research in occupied Holland. (Pasteur Institute, Utrecht; Physiological Laboratory of the Institute of Nutrition, Amsterdam; Botanical Laboratory, Utrecht; Organic Chemistry Laboratory.) Most of the work concerned *Penicillium expansum* and Dr. Kogl's theory of cancer in relation to stereo-isomery of amino acids.

ANDREWS, A. H. The aviation medicine organization of the Luftwaffe. Off. Pub. Bd., Report, PB 236. 1945. 6 pp. Price: Mimeo., 10c.

Report on the medical organization of the Luftwaffe illustrated by a chart of the medical organization of the Wehrmacht and the Luftwaffe. Cooperation with Chinese, Russian and Japanese aviation medicine is discussed.

HANVIK, J. E. *Luftfahrt-Forschungsanstalt München, Medizinisches Institut Garmisch-Partenkirchen*. Off. Pub. Bd., Report, PB 124. 1945. 3 pp. Price: Mimeo., 10c.

Brief accounts of research projects in aviation medicine at the *Medizinisches Institut*, which was established by Dr. W. Henschke in 1942, originally at Berlin University, subsequently transferred to Garmisch-Partenkirsche. Types of research: (1) Visual capacity in relation to aiming devices and sites. (2) Trigger mechanisms for guns and turrets. (3) Psychological tests for aircrew selection. (4) Use of drugs (benzedrine, caffeine, narcotics) to improve physical performance and induce euphoria in assault troops and rammer fighters. (5) High altitude adaptation: two to six

[1] Supplied by the Information Service of the Council for Scientific and Industrial Research.

weeks by hard physical exercise at 12,000 feet increased altitude tolerance by 1,500 to 2,000 meters. (6) Ultra-violet and infra-red rays: problems in relation to gun sites. (7) Philosophical aspects of aviation and medicine. (8) Capillary stability in relation to pilot fatigue. (9) Eye prosthesis and extremity prosthesis: conversion of visual to auditory stimuli; electro-mechanical prosthesis directed by impulses from amputated nerves.

HENZE, CARL, AND CROMARTIE, WILLIAM J. Medical targets in Strassburg area. Off. Pub. Bd., Report, PB 229. 1945. 45 pp. Price: Mimeo., 25c.

A survey of various research institutes in the Strassburg area with a discussion of special fields of research—influenza, typhus, epidemic hepatitis, yellow fever.

HOWARD, THOMAS W., *et alii*. Medical targets in southern Germany. Off. Pub. Bd., Report, PB 247. 1945. 16 pp. Price: Mimeo., 25c.

This report is a study of the medical schools of Munich, Tübingen and Freiburg. It also deals with several Bavarian research institutes, and contains information on medicine, dermatology, hygiene, organic chemistry and pathology. Titles of books and articles published during the war are given, including a list of publications of the Hygiene Institute, University of Tübingen, 1940-1944, many dealing with the sulphonamides, and reprints of articles by Professor Heinrich Wieland, Department of Organic Chemistry, University of Munich. Professor Wieland's work is in the fields of the alkaloids, sterols and pterines. Mention is made of his correspondence with individuals in South Africa relating to sources of curare in connexion with his alkaloid work on curare. Also mentioned is a manuscript by Kuhn on infectious hepatitis, awaiting publication. Other research mentioned is the vitamin therapy work of Dr. Stepp and the extension of the work of Franz Büchner on the effects of oxygen deficiency on the heart muscle *et cetera*.

HOWART, WILLIAM A., *et alii*. Medical research in Paris. Off. Pub. Bd., Report, PB 534. 1944. 14 pp. Price: Photostat, $1.00; Microfilm, 50 c.

Report on results of medical research at the Pasteur Institute. Research covered: the preparation and method of administration of penicillin; typhus vaccine; diphtheria toxin, toxoid and antitoxin; tetanus toxin and toxoid; bacterial vaccines; rabies vaccine; sulphonamides and related compounds. The following items of equipment were unusual enough for special mention: an ultracentrifuge used for virus research; a microforge used to make very small instruments from glass; a micromanipulator for microscopic dissection and manipulation; apparatus for cinemicrography; a microbiophotometer for recording growth rates of bacteria. Brief notes on work at the Rhone-Poulène Laboratories, the Distillerie de Deux-Sèvres and the Institut National d'Hygiène are also included.

JEFFCOTT, GEORGE F. Dental education, practice and equipment in Germany. Off. Pub. Bd., Report, PB 539. 1945. 43 pp. Price: Photostat, $3.00; Microfilm, 50c.

Description and evaluation of dental education and training in Germany which is far inferior to the American. There are two types of dentists in Germany: Zahnärzte, who has a longer period of education, and "Dentist", who is a mechanical dentist trained largely through apprenticeship. Dental care is included in a general insurance plan which provides a large amount of mediocre dental care for more people than would be possible under private industry. Caries research has been sporadic and has not resulted in any new methods. Reliance is placed on the administration of vitamins *C* and *D*. Acrylic resins are most widely used for dental plastics. Dental plastics are manufactured by Kulzer and Company, connected with I. G. Farben and Heko-Werke. No new basic plastics for dental use were discovered. Although high-carat gold alloys are preferred, they are not widely used for economic reasons. Alloys containing 10% gold, 20% palladium and 70% silver were used and will probably continue to be. Stainless steel is used for wire for clasps. Principal manufacturers of dental alloys are listed and German military dental equipment is described. A brief note on gas-cooled, supposedly painless dental burrs is also included.

LOVELACE, W. R., II. Research in aviation medicine for the German Air Force. Off. Pub. Bd., Report, PB 251. 1945. 83 pp. Price: Mimeo., 50c.

This investigation into the activities of personnel and institutions in the field of aviation physiology, medicine and "human engineering" indicates that important work has been accomplished on the following subjects: pilot ejection; emergency procedures for escape from pressurized cabins at high altitude; effect of high-wind velocities on the human head, thorax and abdomen; research and development of personnel parachute; and the liaison approach between aircrew and machine being operated, to improve efficiency of operation. The report also contains a number of appendices dealing with the Medical Research Institute at Garmisch-Partenkirchen, studies on the effect of high-wind velocities on human subjects, pressure cabins and pilot ejection seats, as well as other subjects of aviation medical interest.

MCCARTHY, CHARLES L. *Hygienische Institut des Ruhrgebiets, Gelsenkirchen*—Organization of Hygienic Inst. Off. Pub. Bd., Report, PB 233. 1945. 7 pp. Price: Mimeo., 10c.

Organization, functions and activities of the *Hygienisches Institut*, a private institution, with functions similar in many respects to those of a State public health laboratory in the United States. Two-thirds of the laboratory buildings found useless when visited, April 19, 1945. Estimate of general health conditions of the population served obtained in an interview with Dr. Heine, the director. Formula for a modified tellurite medium designated as "Corrected Clauberg III, Medium", used in cultural diagnosis of diphtheria given in appendix.

MCCARTHY, CHARLES L., FREEMAN, MONROE E., AND SOUTHWORTH, HAMILTON. Interviews with Professor Doctor Werner Schulemann, malariologist, formerly of Bonn University. Off. Pub. Bd., Report, PB 239. 1945. 28 pp. Price: Mimeo., 25c.

This report consists of two separate interviews with the Dr. Werner Schulemann. It contains a report on the use of "Atebrin" and chinoplasmin on 257 soldiers with benign tertian malaria, and discusses Schulemann's experimental research on antimalarials. A description is given of his methods, and of the chemical formula and synthesis of the S series of compounds ((Dimeplasmin-Diapromin).

MCCARTHY, CHARLES L. *Kaiser Wilhelm Institut für Arbeitsphysiologie; Forschungs-Institut für Gewerbe-und Unfallkrankheiten*; Paul Stratmann and Co. Off. Pub. Bd., Report, PB 53. 1945. 1 p. Price: Mimeo., 10c.

Very brief account of visits to two institutes engaged in research connected with diseases of coal and iron workers, and to a plant which was said to manufacture protective clothing, especially fireproof clothing and masks.

MCCARTHY, CHARLES L., AND HENZE, CARLO. *Kaiser Wilhelm Institut für Arbeitsphysiologie am Bad Ems und am Dietz a. d. Lahn*. Off. Pub. Bd., Report, PB 358. 1945. 16 pp. Price: Mimeo., 25c.

The *K.W.I. für Arbeitsphysiologie* studied the problem of raising efficiency and lowering fatigue among workers by applying the results of physiological research to labour problems. All influences affecting human efficiency were thoroughly examined, especially nutrition, drugs, climate and constitution. About 120 papers on these studies of industrial physiology have been published since 1940. Studies at the institute were made chiefly on workers in the mining and iron and steel industries, and in agriculture and forestry. The following types of studies were made: investigation of the coordination of sensory and motor performances involved in skilled and exacting work; knowledge of the general principles applying to an optimal arrangement of rest periods; the elucidation of the nature of "nervous exhaustion", as well as the psychological problems affecting the limits of "readiness" for work; and the pharmacology of work, especially the study of drugs used to increase work, or to reduce fatigue.

MCCARTHY, CHARLES L. *Pfaffenrode Hailenstalt für Geistes Krankheiten* (Pfaffenrode Insane Asylum). Off. Pub. Bd., Report, PB 57. 1945. 4 pp. Price: Mimeo., 10c.

The buildings of the Pfaffenrode Insane Asylum housed the antimalarial research section of the Tropical Medicine Department of the Robert Koch Institute. Patients for whom fever therapy was prescribed were selected for direct infection by bites of mosquitoes infected with *Plasmodium vivex* or *Plasmodium falciparum*. The report describes methods and results of antimalarial treatments with quinine hydrochloride, "Atebrin", plasmochin, sontochin-c and "Bemural" (a new I.G.F. product). Brief comments are also made on cultures of plasmodia and the effectiveness of insecticides.

MCCARTHY, CHARLES L., *et alii*. A series of interviews with members of German medical schools, research institutes and hospitals. Off. Pub. Bd., Report, PB 361. 1945. 48 pp. Price: Mimeo., 25c.

Report of research at the following medical schools and research institutes: Medizinische Fakultat, Tübingen; Medical Research Institute, Garmisch-Partenkirchen; Medizinische Fakultat, Vienna; Reserve-Lazarett, Horsching, Austria; University Medical School Innsbruck; Neurosurgical Institute of Berlin; Medizinische Fakultat, Marburg; Medizinische Fakultat, and Veterinarmedizinische Fakultat, Giessen; Medizinische Fakultat, Munich; Medizinische Fakultat, Würzburg; William G. Kerckhoff Institute, Bad Nauheim.

British Medical Association News.

ANNUAL REPRESENTATIVE MEETING.

THE 1946 annual Representative Meeting of the British Medical Association was held in the Great Hall, B.M.A. House, Tavistock Square, London, on July 23, 24 and 25, 1946, DR. J. B. MILLER, the chairman of the Representative Body, in the chair.

National Health Service.

The most important item on a lengthy agenda of 175 motions was that dealing with the report of the Council on the National Health Service Bill and the motions from divisions in regard thereto. When this item came up for consideration a motion was moved:

> That the meeting go into committee.

The carrying of this motion would have meant that the Press would be excluded. In speaking to the motion, the Chairman of Council, Dr. H. Guy Dain, said that he hoped the meeting would reject the motion, as there was nothing that they could not say to the public or in public. The motion was lost by a large majority.

The Chairman of Council, Dr. H. Guy Dain, said that it was important that the meeting should give consideration to the present position in regard to the National Health Service Bill. The bill had now passed through the committee and report stages and the third reading would take place on Friday, July 26. They now knew pretty well what its final shape would be, or at any rate as it would go to the House of Lords. There had been no amendments to the main principles of the bill.

Dr. Dain then referred to meetings that the Association had had with previous ministers, Mr. Brown and Mr. Willink, in regard to a national health service measure, and said that they had nearly reached agreement in regard to the main principles. Then came the election, and as a result a new government whose policy was one of nationalization. For a long time the present minister, Mr. Bevan, had refused to talk with the profession. He had practically adopted in general the proposal of his predecessor, Mr. Willink, but to it he had added nationalization and had refused to negotiate with the profession on the major issues of ownership of hospitals, goodwill, direction and payment. Dr. Dain went on to say that not one of the principles introduced in the bill would make the services to the public any more efficient. They were introduced simply for the purpose of satisfying the desires of the Socialist Party.

In regard to the ownership of hospitals, he regretted to say that the hospital authorities had not contested this issue as he thought they would have done. The result would be that there would be practically no opportunity for specialists to practise outside the service, for there would be no hospitals to which they could send their patients as the Minister could take over all hospitals.

Although it was true that the bill provided that a sum of £66,000,000 would be paid to medical practitioners in respect of any loss of goodwill by those who entered the service, it was also true that the medical practitioner would lose the right to dispose of the goodwill of his practice as he thought fit. During the debate in the House the question of direction of medical practitioners had been glossed over, but the plain fact was that under the act the practitioner would be easily and simply controlled. In regard to the question of payment the Minister had admitted that the introduction of a fully salaried service was not desirable in the public interest because it would result in direction of patients, but he had also said that payment should be made partly by salary. This, Dr. Dain said, was simply another way of controlling the profession. The Minister had refused to concede the right of any practitioner to enter the service or of appeal to the courts. The profession simply could not let the last appeal lie with the Minister for Health. (Loud cheers.) The Minister was the complete and uncontrolled dictator. He would control the appointment of every committee and of every chairman of a committee. The profession should not let itself in for a service of that kind. (Loud cries of "No".) It would mean in effect that the profession would be directed and dictated to by civil servants. Dr. Dain then referred to the present position of the profession. It had laid down certain principles which were meant to establish the freedom both of the public and of the profession. He thought that a fair statement of the Minister's views in regard to the profession was that they were good fellows, excellent at their jobs, but that in politics they talked airy nonsense. Dr. Dain then referred to the decisions of the Special Representative Meeting held in May, and said that the time had now come when one or other, the profession or the Minister, must give way. A conflict was inevitable. The question then was what was the profession going to do. Were its members going to stand by the decisions of the Special Representative Meeting. (Loud cries of "Yes".) The Council could not vary those decisions, nor could it negotiate with the Minister in regard to regulations without the permission of the Representative Body. Dr. Dain then referred to the request of the deputation from the Insurance Acts Committee that had waited on the Minister for an increase in the existing capitation rate and of the Minister's reply that the matter could not be discussed separately from the major issue of payment of practitioners under the new service. The Minister had always said that the profession was divided. It was true that some were socialists and would accept the bill. But others were not socialists and believed the change would be to the disadvantage of the public and would therefore not take part in the service. Where then did the profession stand? Each individual doctor would have to make his own decision, and the question was then when should this be done. The first thing that had to be decided was whether further negotiations should take place with the Minister in regard to regulations, and in this regard an approach would be made to the profession in the autumn.

It was continually said that the Representative Body did not represent the profession. So far as the Council was concerned it must accept its decisions. It had been said that the profession might accept service if the terms and conditions of service were good. However, the conference of the Insurance Acts Committee did not indicate that the terms and conditions would be good. He thought it would be wise to wait till the bill became an act before obtaining the views of the profession. Dr. Dain then said that he had listened a few nights before to a very able broadcast talk by the Lord President, Mr. Herbert Morrison, who in the course of his talk said that the Government was out for planning for liberty and order and for freedom. That was just what the profession wanted. In conclusion, Dr. Dain said that if the profession decided that the bill was a bad thing, then it was in their hands. (Loud and prolonged cheers.)

A lengthy discussion then took place on a motion of the Leicestershire and Rutland Division.

> That this meeting recommends to the Council the desirability of circulating a referendum to each consultant and general practitioner when the time is deemed opportune.

An amendment was moved by Cambridge and Bedfordshire Division:

> That a referendum of the whole profession be taken soon on the simple issue whether negotiations should take place with the Minister on regulations.

This, being carried, became the substantive motion. A further amendment was then moved by Marylebone representative:

> That a referendum of the whole profession be taken soon on the simple issue whether negotiations should take place with the Minister on regulations and that the meeting recommends to Council the desirability of the referendum including personal contact with each member of the profession as soon as this can be arranged.

This being carried, became the substantive motion, which on being put to the meeting was carried by a large majority.

Organization.

In moving the adoption of the remainder of the annual report under "Organization", the chairman of the Organization Committee, Dr. J. A. Pridham, stated that the membership of the Association was now 52,507, the largest it had ever been, despite the fact that South Africa with its membership of over 2,000 had separated from the Parent Body. Nine hundred of the South African doctors had intimated their desire to continue as overseas members of the Association.

Expenses of Members Attending Meetings.

The representative for Oldham moved a motion to the effect that the Representative Meeting should ask the Council to consider again the question of payment of expenses on a standard scale to representatives attending a Representative meeting.

There was considerable discussion on this motion. It was pointed out by the mover that it was unfair to young members of the profession that they should be required to

attend meetings without having at least some of their expenses paid. One of the reasons why young men did not take a greater interest in the Association's affairs by acting as representatives was that they could not afford the cost involved. An amendment moved by Eastbourne representative, that the expenses of members attending the annual Representative Meeting should be met locally and not from central funds, was lost 84 to 98.

An amendment by Shrewsbury representative which was accepted by the Leeds representative stated that payment for attendance at annual Representative Meetings should be met locally and for Council and committee meetings by central funds.

The Treasurer, Dr. J. W. Bone, pointed out that if the motion was carried, it would result in a greatly increased expenditure by the Association; over £6,000 was involved. On his suggestion it was agreed to refer the matter of payment of expenses to the Council.

Hospital Administration.

The chairman of the Hospitals Committee moved that the following recommendation of Council under the heading of "Hospital Administration" should be approved:

> That the following statement on hospital administration be approved:
>
> 1. The chief of a Regional Hospital Board should be a medical practitioner with experience of hospital work.
> 2. The administrative head of a large hospital or group of small hospitals should ordinarily be a medical practitioner, designated medical superintendent.
> 3. The medical superintendent should have full responsibility for the general administration of the hospital, specialized functions as accountancy being delegated to the appropriate lay heads of departments. He should exercise his medical functions in consultation with the medical staff committee.
> 4. The medical superintendent should, where possible, take an active part in the clinical work of the hospital, but should have no clinical control of patients in the medical care of other members of the senior medical staff.
> 5. In every hospital there should be a medical staff committee, which should be composed of all members of the medical staff in charge of beds or departments and all other senior members of departmental staffs, together with representatives of the junior medical staff and the medical auxiliary staff.
> 6. The functions of the medical staff committee should include consideration of all matters affecting the treatment or comfort of patients.

The Bradford representative moved an amendment to Clause 2. He wished the word "ordinarily" to be deleted and the words "not necessarily" to be substituted. He also wished to have the words "designated medical superintendent" to be deleted.

In moving his amendment, the Bradford representative said that, as it stood, Clause 2 was really an insult to the many lay superintendents of voluntary hospitals who over many years had done excellent work as administrative heads. He thought that it was preferable to have a lay administrator working under the direction of the medical board than a medical superintendent not responsible to the medical board. The Bradford representative was supported by the Marylebone representative and other speakers.

Those who opposed the amendment, including the chairman of Council, pointed out that a new era was developing in hospital administration and that it was essential that medical practitioners should be the administrative heads of hospitals.

The amendment was lost by a large majority.

National Health Insurance.

Report of the Spens Committee.

Dr. E. A. Gregg, chairman of the Insurance Acts Committee, moved the recommendation of Council:

> That the Representative Body welcomes and approves the majority report of the Inter-Departmental Committee on the Remuneration of General Practitioners.

He said that at the present moment it was of the greatest importance that the profession should give its approval to the Spens report. The outcome of this committee's deliberations had given more satisfaction to the profession than that of any other committee appointed to deal with the question of remuneration.

Dr. J. A. Brown, deputy chairman of the Insurance Acts Committee, who was a member of the Spens Committee, drew the attention of the meeting to the recommendation of the Spens Committee dealing with the question of making payment to medical practitioners in sparsely populated areas, and said that the difficulty in obtaining medical practitioners for these areas had been due in the main to the miserable payment that had been made to insurance practitioners. He also drew attention to the view expressed by the Spens Committee that adequate payment should be made to general practitioners if recruitment to this branch of the profession was to be maintained. He said that if this was not done a similar position would arise to that in the nursing profession, where because of poor conditions of service it was difficult to obtain recruits to the profession.

The recommendation was unanimously adopted.

The Capitation Fee.

Dr. E. A. Gregg then dealt with the question of the capitation fee. He said that the Insurance Acts Committee had recently made application to the Minister for Health for an increase in the capitation fee and had met the Ministry of Health on three occasions. The Minister had been present on the first occasion, and stated that he wished to associate the application with discussions on the remuneration of doctors under the new national health service. The Minister was informed that the deputation had been authorized to discuss the present capitation fee only, and it was not within its province to embark on discussions of the character to which he referred. The result of the conference with the Minister was unsatisfactory, but they had been invited to meet the Ministry again.

At the second conference, at which the Minister was not present, the question of consideration of the remuneration under the new service was again raised, but, as on the first occasion, the Ministry was informed that the representatives of the Insurance Acts Committee could not discuss that question, and further, that the profession was opposed to the proposed method of payment under the new service, namely, by basic salary. The Ministry stated that it could not see how the Spens report could be applied to the existing capitation fee, but the representatives of the Insurance Acts Committee pointed out how, in their opinion, this could be done.

A third conference had been arranged, and at that conference the Ministry announced that the capitation fee would be increased to 12s. 6d. as from January 1, 1946, adding that this in effect was equivalent to a fee of 13s. 1d. as from July 1, 1946. The representatives of the Insurance Acts Committee expressed their extreme dissatisfaction with the miserable offer, and said that they could not understand why if 13s. 1d. was a fair offer at July 1, it was not a fair offer at January 1.

Up to that time the Minister had not intimated that he accepted the Spens report, but in a letter subsequently received the Minister said that he accepted the substance of the recommendations of the Spens Committee in their majority report upon the general scope and remuneration which general practitioners should enjoy in a public service, and that the present capitation fee would be increased to 12s. 6d. as from January 1, 1946. A meeting of the Insurance Acts Committee was convened to consider the Minister's offer, and it was decided:

> 1. That the Minister be informed that the Insurance Acts Committee, while it welcomes the Minister's acceptance of the majority report of the Spens Committee and his recognition of the inadequacy of the capitation fee, regards the proposed increase of the capitation fee to 12s. 6d. as grossly inadequate.
> 2. That the Minister be informed that the Insurance Acts Committee would be prepared to recommend insurance practitioners to accept in the interim a capitation fee of 15s. retrospective to January 1, 1946. The committee would be willing, if the Minister so prefers, that the Spens Committee should be asked to state the implications of its majority report in relation to the current insurance capitation fee on the understanding that the Minister and the Insurance Acts Committee accepted, in advance, the findings of that committee.

At the conclusion of his statement Dr. Gregg was loudly cheered by the meeting, and it was unanimously resolved that the action of the Insurance Acts Committee should be approved.

Milk.

The representative from the Isle of Wight moved the following motion:

> That this meeting is of the opinion that legislation should require that all milk sold to the public should be either pasteurized or from tubercle-free herds.

There was a full discussion on this motion, and whilst there were differences of opinion in regard to the best methods of ensuring a safe milk supply to the public, the meeting was unanimous that urgent action should be taken to see that milk supplied to the public was germ-free.

Finally it was resolved:

> That, ideally, all milk should be obtained from disease-free herds. In the meantime it should be pasteurized, and where this was not practicable, boiled; and that this should be impressed on the Minister as a matter of urgent national importance.

Speakers referred to the all too frequent occurrence of cases of non-pulmonary tuberculosis in children due to bovine infection, and particularly to the sharp rise in tuberculous infection during the war years due to bulk handling of milk.

The Acceptance of Appointments on Boards and Committees under the National Health Service Act.

An important question was raised by the representative of South Staffordshire when he moved an amendment to the motion of Hendon dealing with the action to be taken against members accepting appointments which are the subject of an "Important Notice". The amendment affected a clause which stated that the acceptance of a prohibited appointment should be construed as *prima facie* evidence of an ethical offence justifying expulsion from the Association. The amendment stated that the following words should be added at the end of the clause in question: "And that similar action be taken against any member who accepts an invitation to serve on administrative or advisory bodies set up under the National Health Service Bill until such time as the majority opinion of the profession is known."

The South Staffordshire representative said that he moved the amendment because it was known that members of the profession were already being approached to sit on regional boards. However, as the Hendon representative, Dr. R. Forbes, was unwilling to accept the addition of the words to the end of the clause, the South Staffordshire representative intimated to the chairman that he would submit a separate motion to the meeting. As the requisite notice of the motion, namely, fourteen days, had not been given to the meeting, suspension of standing orders was necessary, and the South Staffordshire representative moved accordingly. The voting was 83 to 32 in favour, but a three-fourths majority being necessary, the motion was lost.

After further debate, Dr. R. W. Cockshitt (Council) gave notice that he would move:

> That in the view of this Representative Meeting no registered medical practitioners should accept membership of any committee or boards under the *National Health Service Act* until the result of the forthcoming plebiscite was obtained.

He moved the suspension of standing orders, which was carried by 91 to 23, the necessary three-fourths majority being obtained.

Dr. Cockshitt then moved his motion, which was carried by a large majority.

Proposal for Affiliation of the Medical Association of South Africa.

In moving the approval of the report of the Council dealing with the matter of the Medical Association of South Africa, the chairman of the Organization Committee said that the Council had submitted to the Federal Council of the Medical Association of South Africa proposals for affiliation on the lines of those in operation between the Association and the Canadian Medical Association. The Federal Council stated in reply that it desired a closer liaison, and suggested that there should be established a new class of membership under which membership of an association affiliated to the British Medical Association would *ipso facto* constitute affiliated membership of the British Medical Association. The motion approving of the report and recommendation was carried unanimously.

Professor J. Brock, chairman of the Negotiating Committee of the Medical Association of South Africa, said that the decision of the meeting would be greatly appreciated by the profession in South Africa, to whom the British Medical Association would still be the Parent Body.

International Relations.

Dr. Pridham, who is chairman of the International Relations Committee, stated that it had been decided to place £1,000 at the disposal of this committee for the purpose of assisting selected British medical practitioners of high standing to give lectures, to be known as the "B.M.A. Lectures", to the profession in different European countries. He stated further that it had also been decided that in the event of the headquarters of the suggested new international organization being situated in London, the Association would be prepared to make the necessary arrangements, at least in the initial stages, for the provision of offices and staff.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on May 30, 1946, at the Robert H. Todd Assembly Hall, 135, Macquarie Street, Sydney, DR. A. C. THOMAS, the President, in the chair.

Tuberculosis and Pregnancy.

DR. W. L. CALOV read a paper entitled "Tuberculosis in Pregnancy" (see page 224).

DR. T. DIXON HUGHES read a paper entitled "Pulmonary Tuberculosis in Pregnancy" (see page 230).

DR. A. J. GIBSON thanked both the speakers for their interesting papers. He thought that the condition of tuberculosis in pregnancy needed careful study in Australia; he knew of no accurate series of figures to be studied in Australia. The whole question had been summed up by Dr. Dixon Hughes; it was not an obstetrical problem alone, but a problem that concerned the physician, the obstetrician, the pædiatrician and the social worker, because they had to consider not only the mother, but the child, and to try to save the child if possible. Dr. Gibson said that, like Dr. Dixon Hughes, many years ago he had been under the impression that a woman with active tuberculosis in early pregnancy should have the pregnancy terminated, because he thought it obvious that if the pregnancy was continued the condition would grow much worse. Since then he had been given to understand that those views were wrong. In one book statistics had been quoted to show whether more women survived who had been pregnant between seventeen and forty years of age than women who had no pregnancies at all. In the first group, consisting of something like 180 women, approximately 50% were worse or dead within two years. In the second group, consisting of a comparable number of subjects who had not become pregnant and had not been interfered with in any way, almost exactly the same number were worse or had died. Such figures showed a great loss of infant life if the pregnancies had to be terminated, and that loss should be considered very carefully when the question under discussion arose. Dr. Gibson thought that what those present had heard in the papers would make them realize that it was deplorable that in New South Wales the facilities for properly looking after, supervising and treating patients with tuberculosis were so bad. The need should be strongly stressed to the Government, not only for the proper treatment for the tuberculous, but also for the inclusion in that treatment of proper provision for the pregnant tuberculous patient. The whole question required a great deal of study.

DR. BRUCE WHITE also thanked the speakers for their papers. He said that they had both given much food for thought. With reference to Dr. Dixon Hughes's figures and Dr. Calov's remarks, which suggested that pregnancy had no effect on patients with pulmonary tuberculosis, Dr. White quoted a few lines from Robert Coutts's book on chest diseases at page 297. The quotation was to the effect that it seemed to be agreed that pregnancy together with a period of puerperium and lactation had an unfavourable influence upon pulmonary lesions. That conclusion, however, was not unassailable, because it was not always easy to separate the full effect of aggravation by pregnancy from the effect due to the disease. Dr. White said that he thought emphatically that except in the acute form of the disease the majority of patients becoming pregnant throve and did extremely well clinically and radiologically. Despite Dr. Calov's suggestion that the uplift of the diaphragm had not much effect on the pulmonary disease, Dr. White had thought

for a long while that the uplift had in many cases been a factor in causing diminution of the disease in pregnancy. As Dr. Calov had said, the uplift of the diaphragm acted very much in the same way as double phrenic paresis. However, Dr. White was emphatic that patients who had suffered or were suffering from pulmonary tuberculosis frequently went from bad to worse after parturition. He had seen too many cases for that finding to be coincidental only. The figures given by Dr. Dixon Hughes and Dr. Calov were illuminating, and Dr. White had formed the intention of analysing in the near future the cases that had occurred in his hospital and private practice. But he could not help feeling that a considerable number of patients who appeared to be in excellent health broke down within a short time of parturition. He remembered one girl who had had a first baby about six or seven years earlier. Frequent skiagrams were taken and no change was noted in her pulmonary condition. She had become pregnant again about eighteen months prior to the meeting, and was very well during her pregnancy. However, within three months of the birth of the baby her chest condition rapidly deteriorated, and skiagrams showed, instead of calcification in the upper zone of the right lung, exudative disease with cavitation and spread to the other side. Dr. White thought that a number of these tragedies, in which patients rapidly deteriorated in health after parturition, might be averted by three measures: (i) prohibition of lactation, which threw an additional strain on the mother; (ii) relief to the mother by taking the child away from her—as far as possible the child should be cared for by someone else, because it was the eternal worry of looking after a young baby that took so much out of even a normal woman, to say nothing of a tuberculous patient; (iii) proper treatment of the tuberculous condition during pregnancy and after. As Dr. Dixon Hughes had emphasized, a great deal could be done by the various forms of collapse therapy, particularly artificial pneumothorax. Dr. White thought that if the condition was suitable, artificial pneumothorax should be induced during pregnancy or as soon as possible—in other words, as soon as the lesion was of exudative type with cavitation. Alternatively, if the patient was receiving artificial pneumothorax treatment, it should be continued during pregnancy and for at least one year afterwards. In the last six or seven years that had been Dr. White's policy in twenty to forty cases and he had seen no ill effects.

DR. DOUGLAS ANDERSON said that Dr. Hughes and Dr. Calov had both shown that the strain of pregnancy and parturition did not necessarily lead to worsening of the patient's tuberculous disease; but they had said, and Dr. White had borne it out, that there was great misgiving amongst the medical profession when a tuberculous woman became pregnant, especially amongst the general practitioners, who were in day-to-day contact with the patients and saw them for considerable periods after confinement. The figures that had been quoted with a large number of deaths gave colour to this misgiving. Dr. Anderson suggested that it was because medical men were vague as to the causes of decline and death of tuberculous pregnant women that such doubts and fears existed. Dr. Anderson then quoted the results of his own small experience of pregnancy in tuberculous women. He said that over the last nine years, sixteen of his patients with tuberculosis had become pregnant, and two had not been delivered up to the time of the meeting. In two instances termination of the pregnancy had been advised. The remaining twelve had produced sixteen children between them. All the twelve mothers were alive and well enough to do their housework; all the sixteen children were alive and well. Of the nine children who had been tested with tuberculin, two were reactors and seven were non-reactors. Not all the twelve mothers suckled their own infants, although they did so in every case in which his advice prevailed. Dr. Anderson believed that when conditions were good lactation did no harm, although in at least half the cases mentioned his advice was overborne by that of the obstetrician who attended the patient at her confinement. It might be suggested that his small series consisted only of patients whose disease was fairly inactive at the time of pregnancy and confinement. That was so in most cases. He could not classify them according to the nature and state of the disease; but he could say that all the patients were happy and confident and their disease was controlled. Those three criteria determined whether a woman with tuberculosis might permissibly bear her infant. Some years earlier Dr. Anderson had treated one other patient in the out-patient department at Sydney Hospital. She was a young woman who had severe tuberculosis affecting both lungs, and she became pregnant; he advised termination of the pregnancy. The patient took a wiser and longer view of the position. She pointed out that she knew she had not long to live, and she knew that she would not be much good so long as she lived. But she wanted, if it was thought that she could do so, to leave something good behind her. She knew that if she could have a baby her mother-in-law and her husband would take good care of it. In view of that, and with the cooperation of the obstetrician, she was allowed to have her baby. She improved in health to a certain extent during the pregnancy, and she delivered herself of the infant, which weighed two pounds and some ounces. She had the satisfaction of living to see the baby grow into a normal child, and did not die until it was nine months old. She did in fact leave something worth while behind her, and was very much the happier at her death for having had her infant and having fulfilled herself in that way. Referring to the reasons why so many women broke down in health from tuberculosis after parturition, Dr. Anderson said that it was not necessarily because their disease was active. Most of his own patients had active disease; others whose disease was inactive broke down some time after confinement. It was not because of the strain of labour, as Dr. Calov and Dr. Dixon Hughes had shown. It was not because of lactation, if any weight was to be given to his own small series and to the ample authority which existed for advising lactation to a tuberculous mother who was reasonably able-bodied. It was not because of contact with the child; Dr. Anderson thought that if the child was taken away from the mother, she was only half a mother, and the removal of the child was sometimes the source of severe nervous tension which contributed materially to the breakdown. The burden of household duties had been referred to by Dr. Dixon Hughes. Dr. Anderson did not doubt that the strain of keeping house at the present time, with lack of domestic assistance and a young child, was a potent source of breakdown. No effort should be spared to overcome this problem of lack of domestic assistance for mothers with young families. Another great danger to the tuberculous mother was the fear of another pregnancy occurring too soon after the first. Unless the mother was well aware of and practised in measures to avoid another pregnancy, fear led to aversion from intercourse, or at least an atmosphere of restraint: that might be rationalized as dyspareunia and get the mother into deep water with the gynæcologists and add to her troubles; it might lead to frigidity or to *coitus interruptus* with their psychological consequences, and whether or no to nervous tension of a depressing kind. This last, in Dr. Anderson's firm belief, was a great cause of recurrence of tuberculous disease. Finally, Dr. Anderson said that there were two questions which those present might ask themselves when confronted with patients who were pregnant or had recently had a child. In the first place, they should remind themselves that there were two parties in the pregnancy, the mother and the child, and ask whether the advice they were about to tender would exact too great a sacrifice from either of them. In the second place, in the case of the pregnant woman, they should ask whether there was anything that they could do that would prevent over-exertion, over-fatigue or nervous tension of a depressing kind in the mother or mother to be.

DR. G. B. LOWE said that at the hospital to which he was attached, they had always been in the habit of acting on the advice of the physician. They received many requests for termination of pregnancy, and they had always done what the physician asked. After having listened to the papers and the discussion, Dr. Lowe wondered whether they should go on doing so. He still felt confused. Dr. Calov and Dr. Dixon Hughes had told those present one thing, Dr. White had said something else. The question was not only one of the pregnancy—the delivery of a tuberculous patient was not difficult; it was her medical state. Dr. Lowe feared that the obstetrician must continue to do what the physician advised. Dr. Anderson's twelve cases were a considerable number. The few tuberculous patients whom Dr. Lowe had seen go through pregnancy had died. How was the difficulty to be overcome? Why should termination of a pregnancy be in any way likely to produce worsening of the condition of a tuberculous patient if it was properly done? In general, there were no facilities for the care of tuberculous patients continuing with pregnancies; there were no special wards, and such patients were more or less looked upon as pariahs; no one wanted to go near them, and most hospitals did not want to take them. What was to be done? The post-natal period was probably the most important in the whole process, and these patients should be carefully looked after for a prolonged period—three months was not nearly long enough; when one talked of tuberculosis, one should talk in years. Recurrences took place; apparently in many cases the disease was arrested, and it turned up later on. Referring to Dr. Anderson's remarks about the necessity for preventing a

too rapid succession of pregnancies, Dr. Lowe said that in his experience such patients were exceedingly prolific and constantly pregnant. Dr. Lowe would be grateful if Dr. Anderson could tell him of a reliable contraceptive. In the last edition of "Year Book of Obstetrics and Gynecology" there were only two articles on tuberculosis in pregnancy. The first article gave fourteen reasons why pregnancy should not continue. The second was by a Mexican author and concerned about 155 patients; some had died, the condition of some had been made worse, and others had gone on to term and were well. Dr. Lowe said that it would appear from Dr. White's remarks that tuberculous patients who had been delivered would have to be followed up for long after they had left the obstetrician's hands to find out what happened to them. Dr. Lowe asked Dr. Calov and Dr. Dixon Hughes for advice on what to do in the future when tuberculous patients were sent in to hospital with a request for termination of pregnancy.

DR. F. A. BELLINGHAM had two points to make. In the first place, he pointed out that in the series of figures quoted there was no differentiation between which were first babies and which resulted from succeeding pregnancies. He considered the matter important. It was his opinion that succeeding pregnancies, especially those beyond two, were not borne as well as the first and second pregnancies. In the second place, Dr. Lowe had asked about reliable contraceptives. Dr. Bellingham wondered whether they should allow a tuberculous patient who had successfully borne one or two babies to go on having children. He thought it would be a good idea if such patients could be sterilized. When a second Cæsarean section was to be performed, it was the custom to ask whether the patient would like to be sterilized at the time of the second operation. Dr. Bellingham asked for comments on these two points.

DR. J. N. CHESTERMAN said that it appeared from the tone of the papers and the discussion that the swing of the pendulum had begun again to the belief that the woman with tuberculosis was not likely to be damaged by pregnancy. But care should be taken not to argue too quickly from the general to the particular. Dr. Chesterman thought it probably true that a pregnant patient with tuberculosis under ideal conditions was not damaged by pregnancy and the upbringing of her child. But ideal conditions were attained all too seldom, and if conditions were not ideal, the question arose whether the pregnancy should be terminated on the grounds of the social condition of the patient. This led to the question whether the social condition of the patient was, on medical grounds, an indication for therapeutic abortion. On medical grounds, Dr. Chesterman thought it was not a reason for therapeutic abortion. It was a difficult question to decide. Dr. Chesterman did not agree with Dr. Anderson that the patient should be allowed to lactate and suckle her baby; it was putting the baby to far too great a risk of tuberculosis. If the baby was taken away from the mother, certainly she was subjected to the psychological discipline of not being able to feed her infant; but he thought it fairer to the infant, and that had to be taken into consideration. Dr. Chesterman had found the papers and discussion most interesting; but he was not much further forward as to what he should do in any particular cases.

DR. R. B. C. STEVENSON said that they did not know in general whether to terminate the pregnancy or not. All investigations on the subject should be combined with an analysis of what happened to the children resulting from such pregnancies up to the age of fifteen years. It was important to know whether they were good citizens, whether they were weaklings and how many developed tuberculosis. Two of the speakers had indicated their intentions of following up their figures further; Dr. Stevenson thought that their investigations should be combined with the statistics he had mentioned.

DR. A. W. MORROW spoke from the physician's point of view. He said that if, as Dr. Anderson had suggested, the patient was controlled and happy, no one would say that her pregnancy should be terminated. But in most cases it was not known whether the condition was controlled or not. As Dr. Dixon Hughes had said, early diagnosis was important. But Dr. Morrow presumed that if one was going to interrupt the pregnancy, from the mechanical point of view it should be done within the first three months. In these circumstances it was difficult to know whether the tuberculosis could be controlled. If the tuberculosis was known to be controlled, the problem of whether the pregnancy should be terminated was not so pressing. All these points were concerned with the case in which the tuberculosis only was to be considered. For a number of years no one had imagined that the condition grew worse during pregnancy. It was after pregnancy that the condition worsened, and that consideration demanded a nicety of judgement on whether on social and economic grounds the pregnancy should be terminated. If the disease was active, it was difficult to make a decision whether it could be controlled within three months. If after three months the condition was still active, the physician would be rather gallant who would say that the pregnancy should continue. Dr. Morrow had never seen great distress caused to any patient whose pregnancy had been terminated within three months. Statistically, if in any series of about 200 cases the percentage was found to vary one way or the other, much courage would be required to say: "Carry on!" Dr. Morrow thought that if at the end of three months, as a physician, the examiner thought that the condition was still active, then he should recommend that the pregnancy should be terminated. Dr. Morrow thought that that was the only consideration that should lead to termination of pregnancy—that it might bring about the death of the patient. He thought it impossible to say definitely that pregnancy would not hasten death.

Dr. Calov, in reply, thanked those who had taken part in the discussion. Dr. White had disagreed with him, or rather with Cohen, in saying that it was not the relief of abdominal pressure after parturition that caused retrogression. The point was that in the later months of pregnancy, the elevation of the diaphragm caused not a great deal of difference in the size of the thorax, because at the same time the thorax bulged. It was doubtful whether any benefit would follow pneumoperitoneum unless the diaphragm was relaxed. Dr. White had said that after parturition many women went from bad to worse. That was so; but Dr. White had failed to point out that these were mostly women who had to work hard. It was rather a matter of the work after the pregnancy than of the pregnancy and parturition themselves. All those present knew of many apparently healthy women who went downhill in the months after parturition; they had too much work to do. Dr. Anderson, in his small series, had had very good results. Dr. Calov complimented him on the way he kept his patients under control; he must have controlled, not only their diseases, but themselves. Dr. Lowe had suggested that the effects of abortion were no worse in the case of tuberculous patients than in other cases. Dr. Calov said that that depended on how ill the patient was. If a normal person had an abortion, the abortion must do some damage; he could not believe that it did no damage. If the patient was ill, abortion did more damage. It all depended on whether one regarded abortion as an evil or not. Dr. Lowe had said that the tuberculous women of his acquaintance all became pregnant very easily; the difficulty was to prevent pregnancy. That observation was not borne out by Dr. Calov's figures. It seemed to him that the people round Surry Hills, near the tuberculosis clinic, were well educated in that aspect of married life. Referring to the length of time of observation, Dr. Calov said that Cohen had followed his patients for upwards of three or four years. Dr. Lowe had also asked what the obstetrician was to do, whether he was to be guided by what the physician told him or whether he should do what he thought right. Dr. Calov suggested that Dr. Lowe be guided, not only by the physician, but by his own good sense. Everyone was confused about that problem, but it was extremely difficult to generalize. It was necessary to consider the individual case. One could not be downright and say that all women with active disease at any particular period of pregnancy should have the pregnancy terminated *et cetera*. All sorts of conditions had to be considered, and they all had to receive attention. Dr. Bellingham had drawn attention to the importance of noticing the number of each patient's pregnancies. Dr. Calov suggested that Dr. Bellingham should read Cohen's article, in which the author gave a large table setting out the number of pregnancies in each particular case. It did not seem to make much difference whether the woman had one, two, three or four pregnancies, but the confinements in Cohen's series had taken place under nearly ideal conditions. The question of whether a woman should have any more babies or not would depend on the state of the disease and on the state of her economic position in life. In reply to Dr. Chesterman's remarks about social and economic conditions, Dr. Calov said that he thought that the patient's circumstances should be made a medical reason for termination of pregnancy, if necessary. If the woman, after she had had a baby, was going to live under good conditions, she was much less likely to be damaged than the woman who was going to live under poor conditions and to have to work hard. Dr. Stevenson had spoken of the necessity for following up the children for a number of years. Dr. Calov said that the

infants of tuberculous women were as a rule healthy. As a matter of fact, they might be fine, big, bouncing babies. They were born healthy enough; the danger lay in what happened to them afterwards. That was where the question arose whether the children were to be separated from their mothers. If they were allowed to live with their mothers, there was a greater risk of infection. If they were taken away from their mothers, there was less risk of infection, but greater anxiety for the mothers, and there was a possibility that the mothers might go downhill.

Dr. Dixon Hughes, in reply, said that those present should not get the impression that no tuberculous patient's pregnancy should be terminated. There was no question where severe economic conditions and environment were unsatisfactory. In reply to Dr. Lowe, Dr. Dixon Hughes said that he hoped the discussion would stimulate obstetricians to think, and not to be only blind wielders of the curette. The physicians had shown that they had individual prejudices. From figures of the Department of Health which had been quoted, 40% of patients died, and it was not having a baby that killed them. Termination of pregnancy would not necessarily save a patient's life; in fact it was shown that there was little difference in the mortality. His advice to the obstetrician was to think about the patients, to see if he could not do something more. Dr. White had said that much could be done by artificial pneumothorax *et cetera*. Dr. Dixon Hughes had seen many patients live and some die, and recording only those who had not survived gave a wrong interpretation. He wanted the patients to be looked after, to have proper treatment, to be followed up. The performance of curettage was an action of defeatism. It had been done for 100 years, and they were going on doing it, without properly weighing up each patient.

Dr. Thomas, from the chair, thanked those who had read papers and those who had joined in the discussion. He said that as one who for many years practised obstetrics in general practice, he had come to the conclusion that parturition and lactation were physiological acts, and it was common for him to tell his patients that it was not the number of babies they had that upset them, but the work and the worry after they had their babies. Dr. Thomas was firmly convinced that that was the reason for the breakdown of many mothers at the present time. Not even lactation had that effect. Dr. Thomas had learnt a lot during the meeting. With most of those present, he had been in the habit, when tuberculous pregnant patients consulted him, of sending them to consultant physicians to have his opinion about termination of the pregnancy confirmed, and he had been happy within himself that he was doing the right thing. After listening to the papers and the discussion, and in view of the fact that parturition and lactation were physiological conditions, he thought that there was a lot to be said for what had been expounded. The discussion following the papers had given much food for thought.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Courses at Sydney.

A SPECIAL course in gynæcology and obstetrics will be held at the King George V Memorial Hospital for two weeks beginning September 9, 1946. Fee: £5 5s. Candidates are advised to make early application to enrol in this course, which will be limited to sixteen.

A course for general practitioners is at present in progress until September 7, 1946. A further course will begin on September 23 for twelve weeks. Fee: £2 12s. 6d. per week.

Courses suitable for candidates for Parts II of the degree of Master of Surgery and diplomas in gynæcology and obstetrics, ophthalmology and laryngology and oto-rhinology began on July 29 and will be complete on October 18, 1946. Fee: £2 12s. 6d. per week.

It is recommended that candidates for the examination for the membership of the Royal College of Obstetricians and Gynæcologists, which will take place in Sydney in February, 1947, should enrol for the present course for Part II of the diploma in gynæcology and obstetrics.

Courses suitable for candidates for Parts I of the degree of Master of Surgery and diplomas in gynæcology and obstetrics, ophthalmology and laryngology and oto-rhinology will begin for eight weeks on September 16, 1946. Fee: £26 5s. (part time). The course for candidates for Part I of the degree of Master of Surgery will in part be suitable for candidates taking the examination for the primary fellowship of the Royal College of Surgeons of England which will be conducted in Sydney on January 6, 1947.

A course suitable for candidates for Part I of the diploma in psychological medicine will be announced later.

Country Courses.

Parramatta.—A course will be held at Parramatta on October 19 and 20 in conjunction with the Central Western Medical Association. Fee: £1 1s. Applications should be forwarded to the Honorary Secretary, Dr. K. S. Macarthur Brown, 12, George Street, Parramatta.

Newcastle.—A course will be held at Newcastle on October 26 and 27, in conjunction with the Central Northern Medical Association. Fee: £1 1s. Applications to attend should be addressed to the Honorary Secretary, Dr. E. J. Egan, 69, Hunter Street, Newcastle.

Wollongong.—A course will be held at Wollongong on November 2 and 3 in conjunction with the South-Eastern Medical Association. Fee: £1 1s. Applications should be forwarded to the Honorary Secretary, Dr. R. A. Green, Port Kembla.

Annual General Course.

A film programme has been arranged for August 21 at 4.15 o'clock p.m. at the Stawell Hall, 145, Macquarie Street, Sydney. The programme will consist of "Technique of Skin Grafting, Pothe" and "Peptic Ulcer".

The annual general course conducted by the Post-Graduate Committee includes attendance at all regular monthly film showings, winter lectures, occasional lectures *et cetera*, held throughout the year, the subscription being £1 1s. *per annum*. Members of the annual general course are entitled to receive the *Post-Graduate Bulletin* at a fee of 10s. 6d. *per annum*.

Information concerning these and other activities may be obtained by calling at the office of the Post-Graduate Committee, 131, Macquarie Street, Sydney, or by telephoning BW 7483, B 4606.

Correspondence.

MALARIA IN THE SOUTH-WEST PACIFIC.

SIR: Brigadier Fairley's characteristically penetrating analysis of the malarial hazards in the Pacific operations and how they were met (THE MEDICAL JOURNAL OF AUSTRALIA, August 3, 1946, pages 145-162) brings memories to some of us and much food for thought to all. Those memories are not always pleasant, and, for myself, I would not willingly relive the latter part of 1942. For example, a malaria control unit under Lieutenant (later Major) S. L. Allman went in with the force to Milne Bay early in August, but lost all its equipment and stores in a ship sunk at the jetty. In spite of the most frantic efforts, we could get no fresh stores sent in for four months; tons of materials went north, but time and again were off-loaded *en route* for "more urgently needed" stores, and all this time malaria was mounting to ever-more appalling heights. The Directorate of Supply and Transport thought we were peevish, insatiable fellows, until Brigadier R. T. A. McDonald went forward to investigate for himself. That was a landmark in malaria control, for from then to the end of the war the Australian Army Service Corps never once failed again with malaria control supplies. Brigadier McDonald's is a name that deserves to be recorded in the annals of malaria control. About the same time, Colonel (then Lieutenant-Colonel) E. Ford sought and obtained an interview with the Commander-in-Chief, which has become legendary, and had the immediate effect (amongst others) of diverting overnight 1,000 native labourers from "more urgent" duties to malaria control. The malaria control units in the area (two by then) were able to develop their control programme to the full, and the case rates fell in the gratifying manner that Brigadier Fairley has recorded. Milne Bay was an invaluable lesson, but at a cost one does not like to remember.

But the part of Brigadier Fairley's paper that will stir the most memories and cause the most soul-searching is that relating to the Wewak epidemic. To those who lived and worked with the Sixth Division for any length of time, his results will be profoundly disturbing, while those who actually belonged to the division, and were proud to belong to it, will find it especially difficult to accept that men who

behaved well in other respects could behave badly in this. So one expects discussion and controversy. It might be useful, therefore (anticipating a forthcoming publication by Major J. E. C. Aberdeen and the writer), briefly to fill in more detail of the epidemiological background than Brigadier Fairley was able to include in his survey, for it is against that background that the results must be interpreted.

In the first place, analysis of the findings in the natives has shown that the malarial situation at Wewak was unusual, in that the native infants were remarkably tolerant of heavy infections and developed an effective immunity at an unusually early age. Whether this was due to racial peculiarities of the human hosts or of the parasites could not be determined. It did indicate, however, that this area was more severely hyperendemic than had appeared at first sight.

Secondly, the study of the gametocyte carriers was most illuminating. Crude gametocyte rates are misleading, for by no means all gametocytes are infective to mosquitoes. In particular, carriers in whose blood gametocytes are scanty are generally poor infectors. Taking all factors into consideration, we may regard the following as the minimum concentration of gametocytes in the blood likely to infect mosquitoes in nature: *Plasmodium falciparum*, 40 per cubic millimetre; *Plasmodium vivax*, 10 per cubic millimetre. On this basis the effective gametocyte rates of the populations examined were:

	Number Examined.	*Plasmodium falciparum*.	*Plasmodium vivax*.
Native infants	73	4·5%	19%
Native children	100	0%	4%
Native adults	100	0%	0%
Japanese	200	4%	5%
Australian troops	524	0·6%	0%

The Japanese were examined on the day they came in after the surrender, so their parasite picture had had no time to change. It is clear, therefore, that our troops had far more chance to acquire their infections from mosquitoes infected from the Japanese or very young natives than from their own members.

This inference is supported by the mosquito dissections. All were *Anopheles punctulatus farauti* Lav. (which name must, unfortunately, take precedence over the well-known *Moluccensis* Sw.), the findings being:

	Number Dissected.	Sporozoite Rate.
From uncontrolled villages	200	2%
Troop encampments (labour compounds), June	155	0·6%
Troop encampments, July	320	0%
Troop encampments, August-September	721	0%

The western part of the Wewak area was air-sprayed with DDT in mid-May, and ground control began towards the end of the month. From June practically to the end of occupation, ten square miles of country were regularly sprayed from the air, in addition to intensive work on the ground by three malaria control units. One feels strongly tempted to believe that these activities had a good deal to do with the falling rates shown in Graph V of Brigadier Fairley's paper.

Taking both sets of facts into consideration, it is evident that, from the end of June onwards, extremely few, if any, new infections were acquired from mosquitoes infected by Australian troops. No troops (except in the Yamil-Maprik area) had any contact with native infants, but the forward units, in which the great majority of cases of malaria were occurring, were in close contact with the Japanese, who had a gross parasite rate of 47% and no effective mosquito control.

What happened earlier in the coastal operations can only be conjectured. Figures for a previous survey by the 2/1 Australian Field Ambulance in April and those for gametocytes in patients admitted to hospital do not suggest that the effective gametocyte rate in our troops was ever significantly higher than that recorded above. Nor was the contact with natives significantly closer. On the other hand, the operations were progressive, so that the troops were continually entering country from which the Japanese had just been displaced, while movement was too fast for really effective mosquito control on the ground to keep pace with it.

The inland operations were in a different category. The country here was deeply dissected, with small, flat, habitable patches on the ridges, on which everyone had to live and fight. The result was a mosaic of refugee native groups, our troop positions and the enemy's, so that a maximum interchange of infection between all three elements was possible. Their relative importance would depend simply on their relative numbers and gametocyte rates.

Biologically, the most interesting observations recorded by Brigadier Fairley are those on the relatively "Atebrin"-resistant race of *Plasmodium falciparum*. That such a race occurred, and that it was sufficiently "fixed" to withstand passage through mosquitoes, were demonstrated beyond doubt. How it originated is another question. One feels on very unsafe ground in attempting to draw an analogy between what happens in organisms like trypanosomes, in which sexual development is unknown, and sexually reproducing animals, especially aberrant types like *Plasmodium*. Drug resistance does develop in sexually reproducing animals (several examples are known in insects, and it has occurred in recent years in cattle ticks), but it has to be selected, and that takes many sexual generations, even when selection pressure is strong, as it undoubtedly would be in the case under consideration. The Japanese had "Atebrin", and selection might have had time to operate on parasites circulating freely among them during the two years or more of their occupation; it is difficult to conceive that it could have even begun to do so in the Sixth Division. The greatest difficulty, however, in accepting "Atebrin" resistance as a new character developed during the war is its complete failure to appear anywhere else in the field, although it had boundless opportunities to do so throughout 1943 and the first quarter of 1944. Nor did it appear in any strains previously isolated at Cairns, although many of these originated from men taking inadequate "Atebrin", for example, in areas where the official dosage was then 0·3 gramme per week.

In short, "Atebrin" resistance could have been present as an inherent, incidental characteristic of no previous selective value in a local race of *Plasmodium falciparum*; it might have developed by mutation and selection in the Japanese, but it could scarcely have done so in our own troops. Whatever their sins of omission in taking their "Atebrin", one feels they must be acquitted of the suggestion that they added to their woes by breeding "Atebrin" resistance in their parasites.

I am indebted to Major I. C. Macdonald and Major J. I. Tonge for the gametocyte counts in the Australian troops, to Lieutenant P. J. O'Sullivan for the June mosquito dissections, and to Major J. E. C. Aberdeen for the other mosquito dissections recorded.

Yours, etc.,
I. M. MACKERRAS.
Council for Scientific and Industrial Research,
Yeerongpilly,
Queensland.
August 5, 1946.

THE DISTRIBUTION OF FLUORINE IN POTABLE WATERS IN NEW SOUTH WALES AND TASMANIA.

SIR: I thought that the authors of "The Distribution of Fluorine in Potable Waters in New South Wales and Tasmania" which appeared in this week's journal might be interested to know of the possibility of dental fluorosis occurring even when the minimal threshold concentration of fluorine is less than in the vicinity of one part per million under certain conditions.

I have a female patient, aged thirteen years, who has a moderate degree of dental fluorosis with a clinical condition of *diabetes insipidus* where the water supply content of fluorine is 0·1 part per million.

This should be noted as a warning for those who would tinker with our water supplies for the purpose of caries prophylaxis.

Yours, etc.,
LEON OPIT.
A.M.P. Building,
21, King William Street,
Adelaide,
South Australia.
July 30, 1946.

AN OBSERVATION ON THE HABITS OF ACARUS SCABEI.

SIR: Several weeks ago, while doing a routine examination of a case of scabies, I opened a new scabetic non-pustular vesicle on the side of the patient's finger looking for the parasite.

I extracted what appeared to be a female acarus, but on microscopic examination found that the specimen consisted

of a mature female and mature male acarus locked together. There was no scale or debris of any sort associated with the specimen, which was taken straight from a clear vesicle after cleansing the lesion with "Monacrin" in spirit.

There was no burrow connected with the vesicle, which was obviously a new lesion.

I am reporting this observation for several reasons:

1. Because it is commonly believed that the impregnated female only is found under the surface layers of the skin and that the male acarus is purely a surface dweller.
2. This is the first time I have observed this phenomenon in spite of innumerable "positive" acarus findings in cases of scabies over a period of years. Such "positive" findings included mature and immature mites, ova and nymphs.

Yours, etc.,

J. M. O'DONNELL, M.B., Ch.M.,
Dermatologist.

Padbury House,
170, St. George's Terrace,
Perth.
July 27, 1946.

SPINAL ANÆSTHESIA AND CHLOROFORM: A COMPARISON OF MORTALITY.

SIR: The pathetic evasions exhibited by Dr. Corlette in his latest letter, which appeared in your issue of August 3, merely emphasize the specious nature of his contentions regarding spinal anæsthesia. Had it not been for the question which he asks about ether in his final paragraph, this further comment would not have been forthcoming.

He wants to know where ether stands if spinal analgesia can be applied with almost absolute safety in certain bad risk cases. The answer is nowhere. Things can be done under properly controlled spinal analgesia that would be fatal under ether. Of course, such an application of the method is highly specialized, and even so is not free from the hazards of human fallibility. But, as I said before, spinal analgesia is no plaything for tiros. Therefore, Dr. Corlette's implication that all and sundry should use it, whenever possible, is arrant nonsense.

I think that any honest man would be prepared to admit his shortcomings in the witness box. But why blame the practitioner entirely for these? He is largely the product of tradition and custom, influenced not only by teaching, study and current practice, but also by the prejudices and conceit of those unwilling to facilitate progress. However, the further pursuit of this subject in its present form is futile and undesirable. The device of *argumentum ad ignorantiam* is never profitable.

Yours, etc.,

S. V. MARSHALL.

143, Macquarie Street,
Sydney,
August 5, 1946.

A PROTEST.

SIR: I wish to protest in the columns of our journal against a statement which is to be found in circulars sent to members of the association. This statement is as follows: "Socialism means control and regimentation of the people by a bureaucracy."

The facts show, on the contrary, that capitalism in its present stage is increasingly bureaucratic, as Lord Hewart, Chief Justice of England, demonstrated in his book "The New Despotism".

State capitalism has itself a very strong leaning to bureaucracy; socialists combat bureaucracy. Recently an editorial in the *British Medical Journal* complained of three points in the British Labour Government's scheme of medical service which is a state capitalist measure, not a socialist one. These three points were: (*a*) That hospital committees were to be appointed by the Minister. (*b*) That medical men in the locality would have no authority in the management of the hospitals. (*c*) That payment for medical services was to be by equal salaries, and not in proportion to work done.

Socialists such as form the Communist Party hold: (*a*) That hospital committees should consist in the main of representatives democratically elected by local people and by local medical men and by other people such as nurses *et cetera* engaged in the actual work. (*b*) That medical men should have complete therapeutic liberty, that is, should have complete freedom in their work—and the patients should have free choice of doctor. (*c*) That payment to medical men should be in proportion to the quality and quantity of work done.

I desire to draw the attention of the profession to the fact that strong support for an antibureaucratic policy can be secured from a great body of supporters of the labour movement. It does not seem sensible to antagonize these people by inept denunciations of socialism.

Yours, etc.,

GERALD O'DAY.

473, Bourke Street,
Melbourne, C.1,
Victoria.
July 24, 1946.

PATENT DUCTUS ARTERIOSUS.

SIR: In the issue of THE MEDICAL JOURNAL OF AUSTRALIA dated July 27, 1946, Dr. Orton infers that comment on the late results of ligation of the patent *ductus arteriosus* implies condemnation of this operation, and of the surgeon who performed the operation. Criticism or condemnation was never further from my mind than at the time of discussion to which reference was made, but it is always wise, both in medicine and surgery, to consider the late results of any procedure, whether those results be good or bad.

I am in full agreement with Dr. Orton in his statement that the field of thoracic surgery is advancing at a very considerable rate, but it is doing so as the result of critical analysis of results of new procedures and the elaboration of new techniques as the result of such criticism. Criticism and condemnation are two widely differing expressions of opinion, and fair comment does not necessarily imply condemnation.

I therefore wish to state that my comments did not imply criticism of Dr. Gebauer, nor condemnation of the principle of ligation of the patent *ductus arteriosus*.

Yours, etc.,

ALAN H. PENINGTON, M.D.

Central Hospital,
Melbourne,
July 30, 1946.

MORTALITY RATE FROM TUBERCULOSIS.

SIR: In an article appearing in the *Sunday Telegraph* of August 4, 1946, it is stated that the Anti-Tuberculosis Association of New South Wales has "released" figures showing that the death rate from tuberculosis is higher in Vaucluse, Manly and Hunter's Hill than in St. Peters, Erskineville and Alexandria. It is also stated that the "association's doctors cannot give any reason for the higher incidence in the 'open-air' suburbs".

In the first place the Anti-Tuberculosis Association has not made a survey of mortality from tuberculosis according to locality. Any figures that have been "released" were presumably obtained from the Government Statistician. The members of the honorary medical staff had nothing to do with capturing them, confining them or releasing them.

In the second place the "association's doctors" have not been asked for their opinion on the reasons for the difference in mortality rate in different suburbs.

As some people still believe what they read in newspapers, I think it right that on behalf of my colleagues I should disclaim responsibility for this article.

Yours, etc.,

W. L. CALOV,
Chairman of Medical Board,
Anti-Tuberculosis Association
of New South Wales.

157, Macquarie Street,
Sydney,
August 5, 1946.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Macintosh, Laurel Jean, provisional registration, 1946 (Univ. Sydney), Tweed District Hospital, Murwillumbah.

The undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

Bonnin, James Arthur, M.B., B.S., 1946 (Univ. Adelaide), 48, Mills Terrace, North Adelaide.

Beard, Roland Maurice Charles Georges, M.B., B.S., 1946 (Univ. Adelaide), 6, Nottage Terrace, Medindie Gardens.

Scragg, Rolfe Frederick Rhodes, M.B., B.S., 1946 (Univ. Adelaide), 27, Prospect Terrace, Prospect.
Venner, Barton Frederick, M.B., B.S., 1946 (Univ. Adelaide), 16, Herbert Road, Ashford.
Seager, Joy Debenham, M.B., B.S., 1923 (Univ. Adelaide), Kingston.
Verco, Luke Everard, M.B., B.S., 1940 (Univ. Adelaide), Main Road, Clare.
Emery, Warren Frederick, M.B., B.S., 1946 (Univ. Adelaide), Royal Adelaide Hospital.
Kohler, Theodore George, M.B., B.S., 1946 (Univ. Adelaide), Royal Adelaide Hospital.
Tassie, Thomas Wilson, M.B., B.S., 1944 (Univ. Adelaide), Box 1369J, G.P.O., Adelaide.
McIntosh, Ronald MacKenzie, M.B., B.S., 1941 (Univ. Adelaide), 20, Park Terrace, Eastwood.
Fisher, Anthony Graham, M.B., B.S., 1946 (Univ. Adelaide), Second Avenue, St. Peters.
Wyllie, Geoffrey Gurner, M.B., B.S., 1946 (Univ. Adelaide), 59, Burnside Road, Kensington Park.
Coats, Douglas Alan, M.B., B.S., 1946 (Univ. Adelaide), 2, Rutland Avenue, Unley Park.
Martin, Stanley Barnford, M.B., B.S., 1946 (Univ. Adelaide), 15, Phillips Street, Somerton.
Draper, Morrell Henry, M.S., 1924 (Univ. Adelaide).
Goatcher, Philip Daniel, M.B., B.S., 1945 (Univ. Adelaide), 1, Verdale Avenue, Newstead.
Sarre, Malcolm Glen, M.B., B.S., 1945 (Univ. Adelaide), 19, Harriet Avenue, Newstead.

Obituary.

JOHN JOSEPH KELLY.

WE regret to announce the death of Dr. John Joseph Kelly, which occurred on June 30, 1946, at Melbourne.

THE FEDERAL MEDICAL WAR RELIEF FUND.

THE following contributions to the Federal Medical War Relief Fund have been received:

New South Wales.

H. R. R. Grieve, C. Gordon MacLeod, £21.
J. N. Chesterman, £15 15s.
S. J. Blumer, £15.
J. C. Belisario (second contribution), £11.
J. H. Broadbent, C. S. Colvin, G. F. S. Davies, R. A. Fairley, C. P. Gordon, D. L. Howell, G. T. Hunter, E. M. McCaffrey, F. McCallum, John Morton, £10 10s.
J. A. Bassetti, A. L. Carrodus, J. Goldman, A. S. Johnson, A. M. Purves, A. S. Waterhouse, £5 5s.
H. C. McDouall, £5.
K. J. B. Davis (second contribution), £4 4s.
Anonymous, Grace M. Bridge, C. W. Coombe, R. A. G. Holmes, James Isbister, K. A. McGarrity, F. W. Niesche, £2 2s.
Thirza A. Alexander, J. F. Boag, Edith M. Hurman, Margery Scott-Young, £1 1s.
Total: £248 7s.
Grand total: £14,821 13s. 6d.

Notice.

THE Australian Branch of the British Psychological Society will hold its second annual congress at Melbourne on August 19, 20 and 21, 1946. The central theme will be "The Predictability of Human Behaviour". Medical practitioners will be welcomed if they care to attend. Full information may be obtained from the Secretary, 147, Collins Street, Melbourne, C.1.

Medical Appointments.

THE following appointments have been made in the Sterility Clinic of the Royal Adelaide Hospital: honorary gynæcologist, Dr. H. M. Fisher; honorary surgeon, Dr. W. J. W. Close; honorary consulting physician, Dr. E. McLaughlin; honorary clinical assistant to the female section, Dr. H. E. Pellew.

Dr. A. J. Geoffroy has been appointed Assistant Medical Officer of Health, Department of Public Health, New South Wales.

Dr. J. H. R. Tremayne has been appointed Medical Superintendent of the Government Institution for Defectives at St. John's Park, New Town, in accordance with Section 54 of the *Mental Deficiency, Act*, 1920, of Tasmania.

Diary for the Month.

AUG. 20.—New South Wales Branch, B.M.A.: Medical Politics Committee.
AUG. 21.—Western Australian Branch, B.M.A.: General Meeting.
AUG. 22.—New South Wales Branch, B.M.A.: Clinical Meeting.
AUG. 22.—Victorian Branch, B.M.A.: Executive Meeting.
AUG. 22.—South Australian Branch, B.M.A.: Council Meeting.
AUG. 23.—Queensland Branch, B.M.A.: Council Meeting.
AUG. 27.—New South Wales Branch, B.M.A.: Ethics Committee.
AUG. 28.—Victorian Branch, B.M.A.: Council Meeting.
AUG. 29.—South Australian Branch, B.M.A.: Scientific Meeting.
AUG. 29.—New South Wales Branch, B.M.A.: Branch Meeting.
SEPT. 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.
SEPT. 4.—Western Australian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

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